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AN EVALUATION OF METHODS AND MECHANICAL DEVICES USED IN THE TREATMENT OF PERIPHERAL VASCULAR DISEASES *

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During the past decade, new methods for investigating the pathologic physiology associated with peripheral vascular diseases and new methods of treatment have been brought forth which have aroused unusual interest in this field of medicine. With the great awakening of interest in this special field of medicine, it is only natural that new mechanical devices should be brought forth, which have as their purpose the increasing of blood flow to affected parts. This is truly a machine age in which we live and mechanically minded members of the medical profession constantly have been bringing forth new mechanical devices which are intended to produce new feet out of old ones and to restore the spring and vigor of youth to legs that are no longer able to serve the purpose for which they originally were created.

Peripheral vascular diseases fall into two main groups, (1) functional and (2) organic. The functional group is well illustrated by Raynaud's disease and erythromelalgia. The organic group is illustrated by thrombo-angiitis obliterans and arteriosclerosis obliterans. Of these four diseases, there is a deficient blood supply to the involved extremities in all but erythromelalgia. Vasospasm plays the predominant role in the production of the symptoms of Raynaud's disease. Thrombo-angiitis obliterans is primarily an occlusive arterial disease that affects the extremities but there is superimposed vasomotor spasm of some degree in the collateral circulation in at least two thirds of the cases which have been observed at the Mayo Clinic.[1] Vasospasm plays a minor role or no role in the production of the symptoms of arteriosclerosis obliterans. Beneficial effects from the use of physical measures and mechanical devices which are employed in the treatment of these diseases must result from the release of vasospasm in the primary or collateral circulation to involved extremities. This is essential to produce maximal blood flow.

Vasospasm Versus Normal Vasoconstriction

In order to evaluate any mechanical device or physical measure which is used to release vasospasm and to increase blood flow in cases of peripheral vascular disease, it is important to appreciate the difference between vasospasm and normal vasoconstriction. This is a subject which has not yet been clarified in the literature. The term vasospasm is employed to indicate spasm in the vessels which is superimposed on the normal degree of vasoconstriction, or tone, which is present in all blood vessels. In previous publications[2, 3, 4, 5, 6] we have pointed out that the degree of vasoconstriction varies in different parts of the body, and that there is a definite vasomotor gradient from the face to the hands and feet, the minimal degree of vasoconstriction being in the head and face with increasing degrees of it in the hands and feet.

* Read at the Eighteenth Annual Session of the American Congress of Physical Therapy, New York, N. Y., September 5, 1939.

The difference between normal vasoconstriction and vasospasm can be demonstrated readily if one considers, for example, a normal person, a subject who has thrombo-angiitis obliterans and one who has Raynaud's disease. If three such subjects are placed under controlled environmental conditions in a temperature of 68 F. (20 C.) and 40 per cent humidity and if the surface temperatures of the various digits of both upper and lower extremities are recorded by means of thermocouples and if the environmental temperature is increased gradually to 90 F. (32.2 C.), a striking difference in the manner in which vasodilatation occurs in the hands and feet of these subjects will be evident. As the room temperature is elevated gradually and the humidity is kept constant, complete vasodilatation will occur in the hands and feet of the normal person when the room temperature reaches approximately 79 F. (26 C.), whereas complete vasodilatation does not occur in the hands and feet of the subject who has thrombo-angiitis obliterans until the room temperature reaches 83 to 84 F. (28.3 to 29 C.), and the room temperature has to be elevated further to 85 or 86 F. (29.4 or 30 C.) or more before complete vasodilatation occurs in the digits of the subject who has Raynaud's disease. In all three subjects, vasodilatation invariably occurs, first in the hands and then in the feet.

It is obvious from these simple observations that the degree of vasoconstriction is greater in the subject who has Raynaud's disease and in the one who has thrombo-angiitis obliterans than in the normal subject. The difference between the environmental temperature at which complete vasodilatation occurs in the normal subject on the one hand and in the subject who has thrombo-angiitis obliterans or Raynaud's disease on the other, is an index of the degree of superimposed vasospasm which is associated with the respective peripheral vascular disease. It is obviously necessary to understand fully the vasomotor control of blood flow to the extremities in health and in disease before the various mechanical devices, which are intended to restore circulation to extremities that have an impaired blood supply can be evaluated accurately.

Material and Methods

In this discourse, we are interested primarily in presenting our observations of surface temperature of the toes produced by the use of the pavex machine (intermittent suction and pressure apparatus), the intermittent venous occlusion apparatus (Collens-Wilensky[7]) and the Sanders bed. These are all mechanical devices which are in current use for the treatment of patients who have peripheral vascular diseases.

In all of our investigations, the results of which are recorded in this article, the normal subjects, as well as those who had peripheral vascular disease, were in a state of basal metabolism throughout the course of the observations; that is, they had been without food for at least twelve hours before our observations were started and no food was taken by them during the course of the observations. Throughout the course of these observations we have assumed that an increase in surface temperature indicates an increase in blood supply to the part in question. All our investigations were carried out under controlled environmental conditions. The psychrometric rooms used were equipped with apparatus capable of maintaining the environmental temperatures within $\pm$ 1 F. and the humidity within $\pm$ 3 per cent. The subject was clad in pajamas and rested on a comfortable bed. The humidity remained constant, at 40 per cent. The surface temperatures of the skin were recorded by means of electromotive thermometers, previously described by one of us (Sheard).[8] These thermocouples were attached to the various digits and were kept in place by means of adhesive tape throughout the course of observation. As many as twenty thermocouples could be applied to a single subject. A thermocouple was used to check the temperature of the room in the vicinity of the patient. By means of this apparatus we were able to obtain the skin temperatures very rapidly and with an accuracy of about $\pm$ 0.1 C.

Pavex (Intermittent Pressure and Suction Apparatus): Passive Vascular Exercise

Landis and Gibbon[9, 10] and Herrmann and Reid[11, 12, 13] deserve credit for introducing the pavex apparatus to the medical profession in its present form. Allen and Brown[14] have previously commented on their clinical experience with the use of this apparatus. The so-called boot treatment which has been heralded by the press as being able to produce new feet out of old ones is used widely at present. The different types of apparatus on the market vary to some extent in general appearance but the fundamental principle is the same. The machine contains a pump which is driven by an electric motor and which, in turn, is attached to a chamber into which the extremity is placed. The chamber is closed at the open end by means of a rubber cuff which fits snugly around the skin of the extremity. The air pressure in the "boot" is alternately reduced (to approximately —80 to —120 mm. of mercury) and increased (to approximately +20 to +60 mm. of mercury). The usual cycle is from fifteen to thirty seconds and the treatment can be carried out over any definite period. The effect of the use of the apparatus on the surface temperature of a normal extremity is illustrated in figure 1.

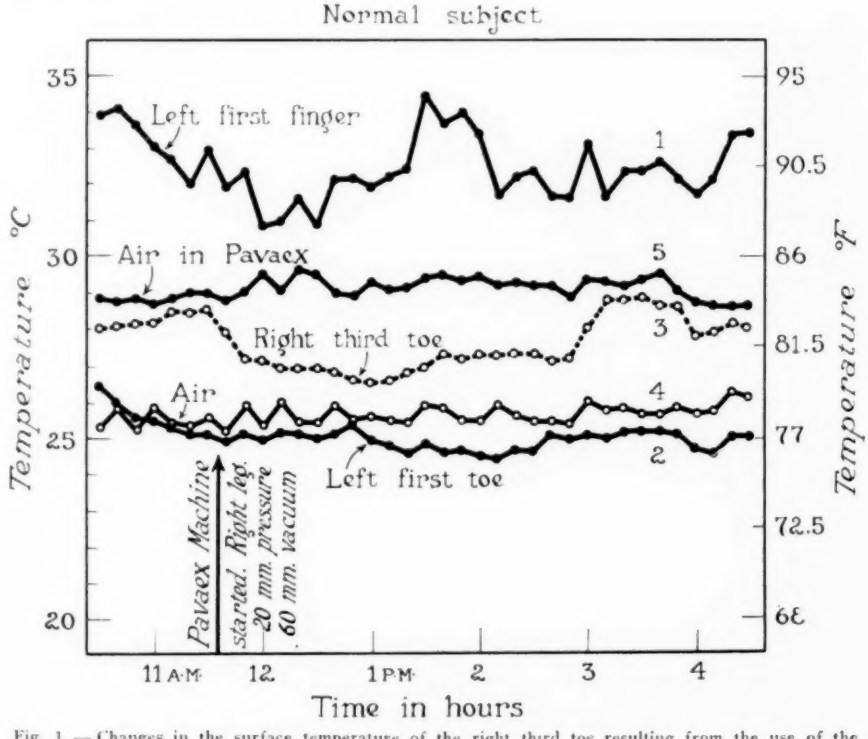


Fig. 1. — Changes in the surface temperature of the right third toe resulting from the use of the pavex machine. For simplicity, the effects on only one toe of each foot and one finger are plotted; this holds true for all figures. Note the fact that the temperature of the air in the pavex machine was approximately 3 C. higher than that of the room. The surface temperature of the toe of the right foot as well as that of the toe of the left foot approached the respective environmental temperatures.

This study was carried out with the patient in the basal state under controlled environmental conditions. The room temperature was approximately 78 F. (25.6 C.). The patient was at rest for approximately one hour before the right leg was placed in the "boot" and was at rest for an additional hour and a half before the rubber cuff was fitted around the leg at the open end of the "boot" and the pavex machine started. It is interesting, first of all, to observe the fact that the temperature of the air in the "boot" of the pavex machine ran approximately 3 C. higher than that of the room. Thus, the toes of the right foot

were exposed to an environmental temperature of 83 to 84 F. (28.5 to 29 C.) whereas the toes of the left foot were exposed to room temperature, namely 78 F. (25.6 C.). The surface temperature of the toes of the right foot, however, ran from 1 to 2.5 C. lower than the air in the pavex boot and at no time did the surface temperature of the toes reach the level of the temperature of the air in the "boot." The surface temperature of the toes of the left foot, which acted as a control, remained from 0.5 to 1 C. lower than room temperature. These observations were carried out for a period of approximately eight

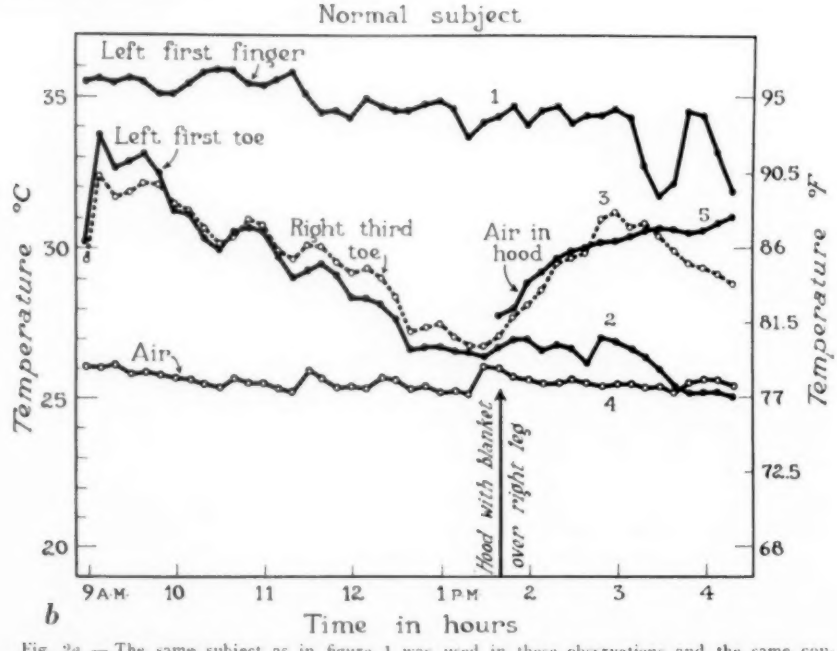


Fig. 2a. — The same subject as in figure 1 was used in these observations and the same conditions were employed, except that the right leg was covered with a blanket, which in figure 2b is indicated by the word "hood." These observations (b) illustrate that under these stated conditions a greater rise in surface temperature occurs from the simple use of a blanket than that which resulted from the use of the pavex machine as illustrated in figure 1.

hours during which time the patient was at rest and no food was given.

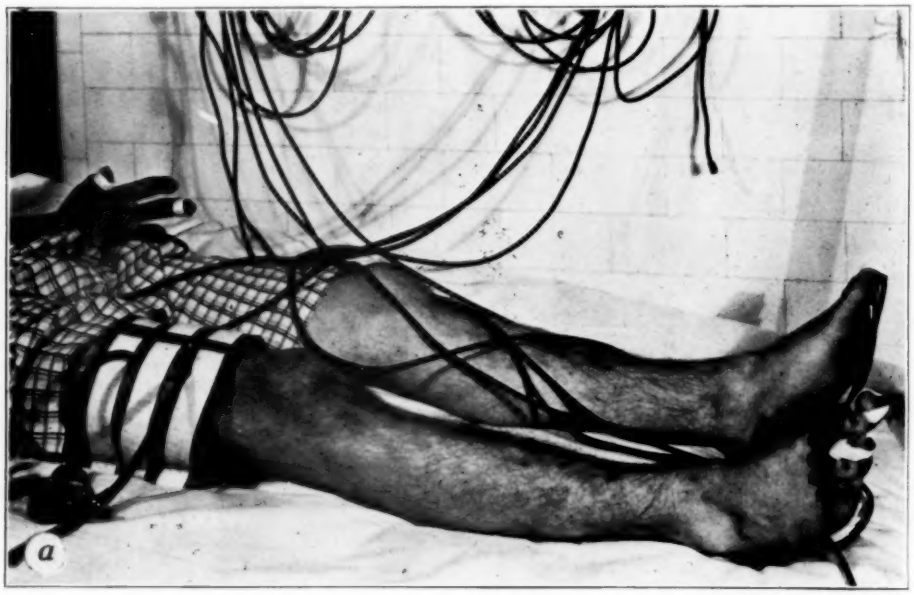
To evaluate the effect of the pavex machine, alone, on the surface temperature of the toes, it is absolutely necessary that the patient refrain from taking food during the course of these observations because the taking of food would produce of itself a great rise in the surface temperature of the extremities. We have demonstrated this fact in previous publications. For the sake of simplicity, only the surface temperature of one toe on each foot was plotted in the graph, although all the toes behaved in a like manner. The surface temperature of the fingers behaved in a similar manner to that which is illustrated by the left first finger depicted in the graph. It is obvious from these observations, which we repeated many times, that we were unable to demonstrate any increase in the surface temperature of the toes of a normal foot, when in a pavex machine, other than that which occurred as a result of localized tissue heating produced by the rise in the environmental temperature of the air in the boot. When these observations were repeated with the same subject without the use of the pavex boot, but with the room temperature at approximately 84 F. (29 C.), which was incidentally the temperature of the air in the pavex boot in the previous observations, the temperature of the toes of the right foot as well as the temperature of the toes of the left foot was considerably greater than that of the room. This illustrates the point that this subject obtained greater rise in the surface temperature of the extremities as a result of the vasodilating effect of the environmental temperature of 84 F. (29 C.) than from the pavex machine itself.

In order to compare accurately the effect of the pavex machine on the surface temperature of the toes with that produced by placing a light woolen blanket over the leg and foot, the study illustrated in figure 1 was repeated, except for the fact that a light woolen blanket was placed over the right leg in place of the pavex boot (fig. 2*a* and *b*). Even though the same patient was used, the initial temperature of the feet is considerably higher than that illustrated in figure 1. However, at the end of approximately five hours, the surface temperature of the toes had decreased gradually almost to room temperature, at which time a thin woolen blanket (fig. 2*a*) was placed over the right leg and foot. The surface temperature of the toes on the right foot began immediately to rise and the temperature of the air beneath the blanket also began to rise (fig. 2*b*); these two curves paralleled each other for the greater portion of the rest of the study. On the other hand, the temperature of the toes on the left foot, which still was exposed to an environmental temperature of 78 F. and to 40 per cent relative humidity, continued to fall gradually and at the end of the study was actually less than that of the air in the room. From a physiologic standpoint, observations of this character indicate that more vasomotor relaxation is obtained by simply placing a blanket over a normal extremity than from the use of the pavex machine. We have carried out these same critical studies with patients who had thrombo-angiitis obliterans and we have obtained similar results.

Intermittent Venous Occlusion

Intermittent venous occlusion has been employed for a number of years in the treatment of occlusive arterial disease and recently its use has been stimulated to a great extent by Collens and Wilensky.[7] A pneumatic cuff is placed around the extremity and is inflated to a point at which it produces venous occlusion (fig. 3*a*). The cuff is alternately inflated and deflated over any given length of time. The effect of such an apparatus on the surface temperature of the toes of a normal subject in an atmospheric environment of approximately 80 F. (26.7 C.) is illustrated in figure 3*b*. This subject had been without food for more than twelve hours when he reported at eight o'clock on the morning of the test. Records of the surface temperatures of fingers and toes were made beginning at 9 a.m. and extending to approximately 5 p.m. During this entire

time, the subject was at rest and did not take any food. For approximately the first two hours (which represented a control period), the surface temperature of the toes on both feet gradually decreased, whereas the temperature of the fingers remained at almost a constant level. At approximately 11 a.m., the intermittent venous occlusion was started at a pressure of 70 mm. of mercury with the cuff applied around the right leg. Almost immediately, there was a sharp rise in the surface temperature of the toes of the right foot, but even a more striking rise was observed in the surface temperature of the toes of the left foot. This phase of the study continued until approximately 2 p.m., at which time the surface



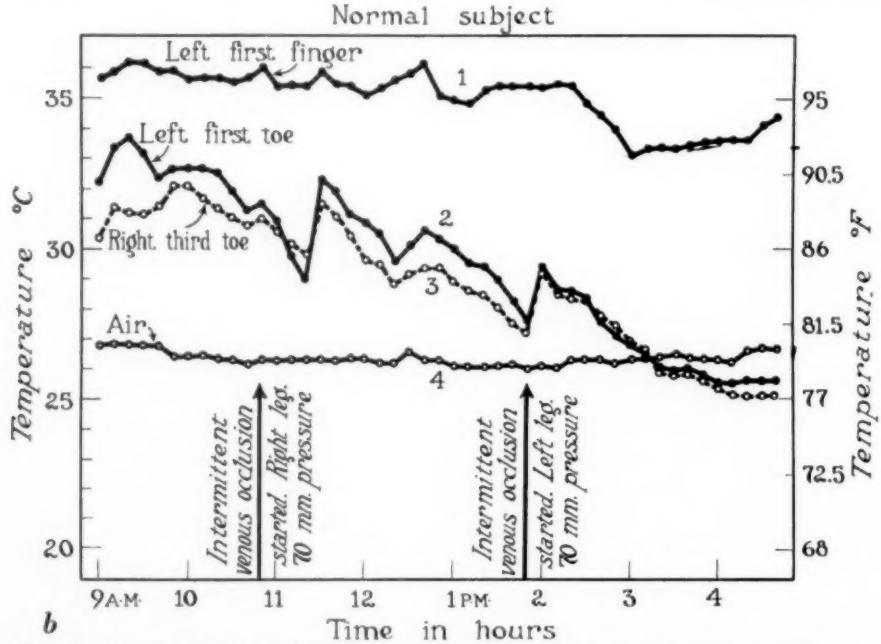


Fig. 3*a*. — Appearance of intermittent occlusion apparatus around right thigh and thermocouples in place; *b*, effects of intermittent venous occlusion on the surface temperature of the toes of the right foot and of the left foot. The surface temperature of the toes gradually decreased to a point slightly below room temperature, illustrating a negative effect of this apparatus on the surface temperature of the toes.

temperature of the toes of both feet had reached a level definitely lower than it was at the time when the intermittent venous occlusion was started.

The cuff was removed from the right leg and was applied around the left leg at 2 p.m. at a pressure of 70 mm. of mercury. When the apparatus was started again a similar sharp rise was noted in the surface temperature of the toes of both feet, followed by a gradual decline in the surface temperature, so that at the end of the study, the surface temperature of the toes of both feet was less than the room temperature. During the entire course of the study, the surface temperature of the toes had decreased more than 5 C. This illustrates in a

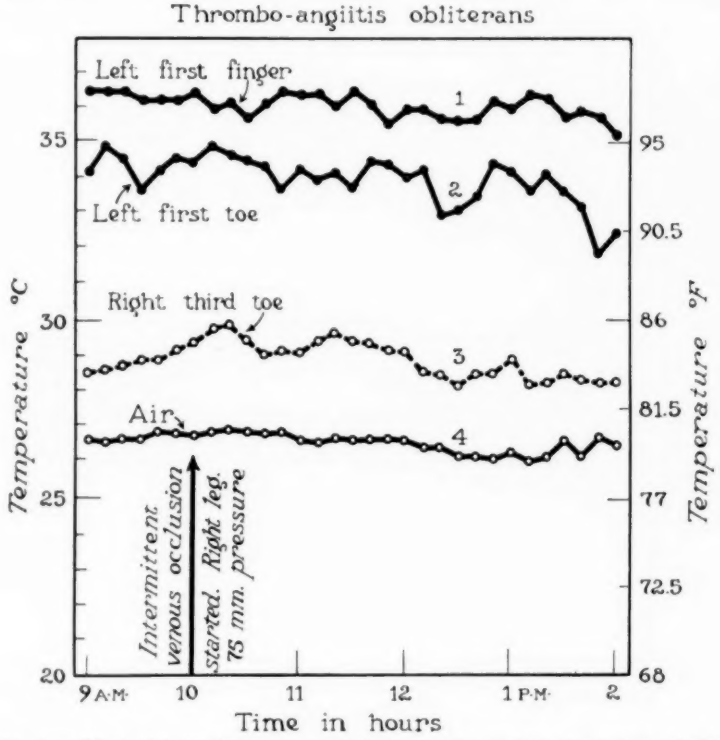


Fig. 4. — Effect of intermittent venous occlusion on the surface temperature of the right foot. No definite change is discernible.

comparatively conclusive manner that in the normal subject, under the stated environmental conditions maintained during the course of this study, use of the apparatus for intermittent venous occlusion neither produced nor maintained any lasting rise in surface temperature of the lower extremities. The same was true when the observations were repeated with the subject in an environmental temperature of 95 F. (35 C.) and 40 per cent humidity.

The effect of the intermittent venous occlusion apparatus in a case of thrombo-angiitis obliterans is illustrated in figure 4. This patient had severe circulatory insufficiency in the right leg but a good collateral circulation was present in the left leg. This patient had been without food for a period of twelve hours prior to the time when our observations were started. After the patient had been at rest for approximately an hour, the intermittent venous occlusion cuff was applied around the right leg at a pressure of 75 mm. of mercury. This was continued for four hours. It is obvious from the graph that there was no definite rise in the surface temperature of the toes of the right foot during the course of the treatment. Approximately complete vasodilatation was present in the toes of the left foot as well as in all the fingers. Only a finger and a toe are illustrated in the graph for the sake of simplicity.

Similar observations were made in another case of thrombo-angiitis obliterans, illustrated in figure 5. The observations began with the patient in an environmental temperature of approximately 80 F. (26.7 C.) with the inter-

mittent venous occlusion cuff applied around the right leg and inflated to a pressure of approximately 75 mm. of mercury. In approximately one hour, the patient was moved on his cot to an environmental temperature of 84 F. (29 C.) and later in the course of the observations, the environmental temperature was raised to and maintained at 86 F. (30 C.). The rise (1 to 2 C.) in the surface temperatures of the toes of the right foot during the course of our observations is

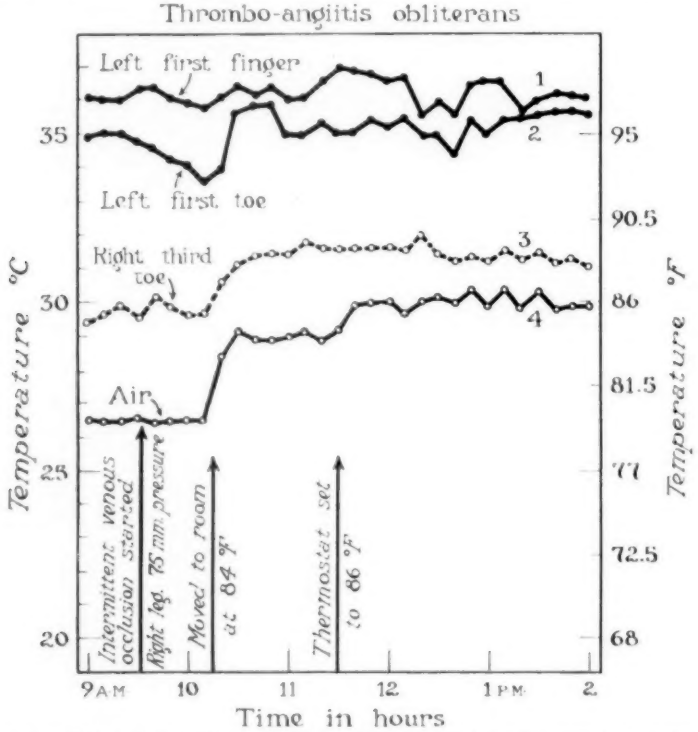


Fig. 5. — Effect of intermittent venous occlusion on surface temperatures. The same conditions obtained as in figure 4 except that the environmental temperature was thermostatically increased from approximately 79 to 86 F. (26.1 to 30 C.). The surface temperature of the right third toe paralleled the room temperature.

to be attributed to the rise in environmental temperature and not to the use of intermittent venous occlusion, since the course of the rise of temperature parallels the rise in environmental temperature. This patient had very good collateral circulation in both lower extremities. The circulation was somewhat better in the left than in the right lower extremity.

Further observations on an additional patient who had thrombo-angiitis obliterans and the effects of intermittent venous occlusion are illustrated in figure 6. When the intermittent venous occlusion cuff was applied around the right leg absolutely no rise in surface temperature occurred in the toes of the right foot under an environmental temperature of 79 F. (26 C.). The temperature of the toes of both feet paralleled the room temperature (fig. 6*a*). The same subject as illustrated in figure 6*a* also is illustrated in figure 6*b*. The intermittent venous occlusion apparatus was applied around the left leg (fig. 6*b*) and no vasodilatation or increase in surface temperature occurred for a period of approximately two hours. The environmental temperature was then raised from 79 to 86 F. (26 to 30 C.). Subsequent to this increase in environmental temperature, more than an hour was required for the temperature of the toes of both feet to reach room temperature but finally their temperature increased to a value about 2 C. (4 F.) greater than the room temperature. We feel that the rise in surface temperature of the toes is entirely due to the increase of the environmental temperature and not to the use of the intermittent venous occlusion apparatus, since the increase of temperature is the same for both the treated and untreated limbs.

From the results of this study and our clinical experience, we believe that the intermittent venous occlusion apparatus is of little value in the treatment of occlusive arterial disease in the extremities as judged from the standpoint of temperature changes (hence increased blood flow). Even when the apparatus is used in an environmental temperature of 95 F. (35 C.) as suggested by Collens and Wilensky, the resulting vasodilatation in the treated extremity is accounted for

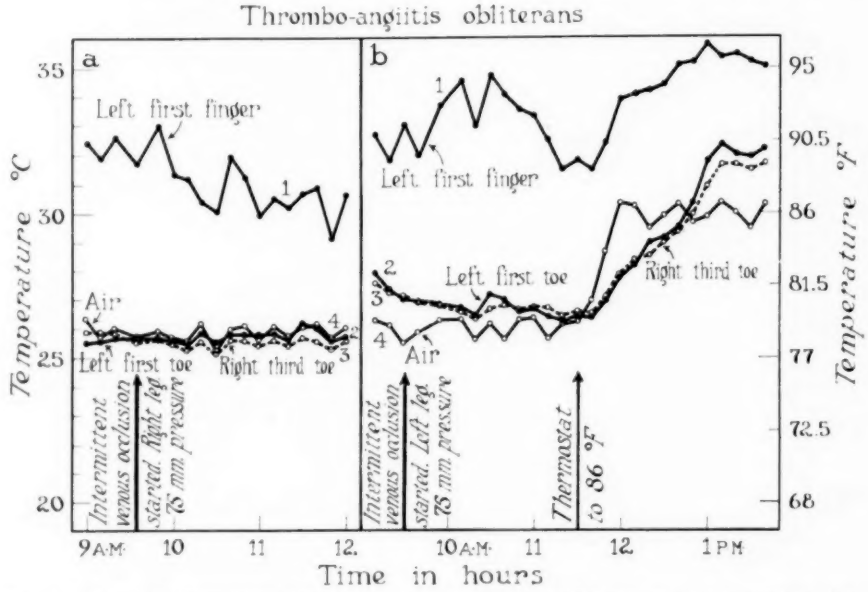


Fig. 6. — Effect of intermittent venous occlusion in thrombo-angiitis obliterans; *a*, essentially the same features as those depicted in figure 4 are shown; *b*, during these observations the environmental temperature was gradually increased from approximately 79 to 86 F. (26.1 to 30 C.). The surface temperature of the toes in these observations closely paralleled room temperature.

readily by the effect of the environmental temperature and not by the use of the apparatus itself.

Sanders Bed

The Sanders bed is an oscillating bed which permits the patient to take passive postural exercises over an indefinite period without any effort on his own part. An apparatus for intermittent venous occlusion also is attached to one particular style of the Sanders bed. As the foot of the bed tilts downward, the cuff around the leg automatically inflates and remains inflated until the foot of the bed is elevated, at which point the cuff automatically deflates. This permits the patient not only to have the benefit of postural exercises but also to obtain whatever benefit is to be derived from intermittent venous occlusion. The effect of such an apparatus on the surface temperature of the extremities of the normal subject is illustrated in figure 7. The same subject is illustrated in both figures 7*a* and 7*b*. The cuff was applied around the left leg and was permitted to inflate alternately to a pressure of 60 mm. of mercury. The surface temperatures of the toes of the left foot were approximately 3 C. greater than those of the right and remained at approximately this same level during the course of the study. The combined effect of the oscillating bed and intermittent venous occlusion did not increase the surface temperature of the toes of the left foot over that which was present at the time when the observations began. The effect of the oscillating bed alone on the surface temperatures of the toes of the right foot was plotted, as a control.

On the following day, the same subject was studied in a similar manner, the only difference being that the cuff was applied around the right leg at a pressure of 60 mm. of mercury (fig. 7*b*). No increase in surface temperature occurred in the toes of the right foot; in fact in both studies the surface temperatures of the toes of the foot where the cuff was applied were lower at the end of the study

than they were at the beginning. Essentially the same observations were made in the same manner with patients who had thrombo-angiitis obliterans, as shown in figure 8. This again illustrates the combined effect of the oscillating bed and the intermittent venous occlusion apparatus on surface temperature of the toes, first of one foot and then of the other. In figure 8*a*, the cuff was applied around the

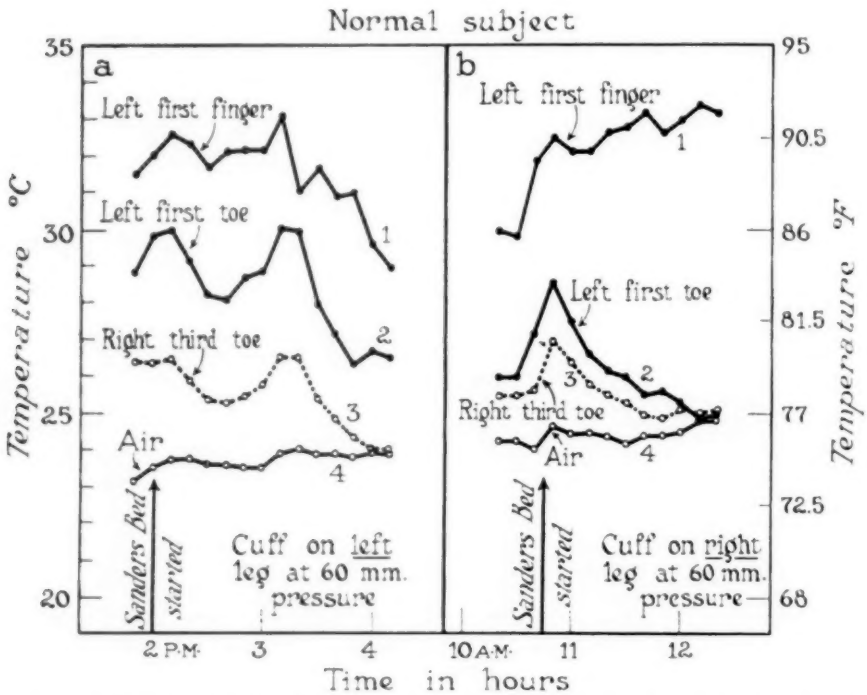


Fig. 7. — Effects of the combined use of Sanders bed and intermittent venous occlusion on the surface temperature of the toes of the right and of the left foot of a normal subject; *a*, the surface temperature of the left first toe was definitely higher than that of the right third toe before the Sanders bed was started and before the cuff was applied. No additional rise in surface temperature occurred after the use of this apparatus. The surface temperature of the toes of both feet gradually decreased during the course of the experiment; *b*, the same results as in *a* hold true with reference to this portion of the figure.

right leg for a period of more than two hours, but during this entire time there was a gradual decrease in the temperature of the right foot. On the following day, the same observations were repeated, using the cuff on the left leg. No rise in surface temperature occurred in the toes of the left foot. They, too, were somewhat cooler at the end of the study than they had been in the beginning.

The effect of the oscillating bed alone on the surface temperature of the digits of a normal subject over a longer period is illustrated in figure 9. It will be noted that the surface temperature of the toes at 3 p.m. was approximately the same as at the beginning of the observations. However when the temperature in the region of the feet was elevated by means of a local heater, and the bed still was kept oscillating, the surface temperature of the toes promptly rose from 81 F. (27 C.) to more than 91 F. (33 C.). This prompt rise was due, not to the oscillating bed, but to the fact that the feet were exposed to an environmental temperature of 86 F. (30 C.; marked on the graph-*cradle temp.*), instead of the 77 F. (25 C.) to which they had been exposed during the preceding part of the study. Hence, the logic of using such an oscillating bed when either the feet or the whole body is exposed to an environmental temperature of 86 F. (30 C.) or more, is evident.

The effect of the ingestion of food on the surface temperature of the toes, while a normal subject is on the oscillating bed is illustrated in figure 10. The curve of the surface temperature of the toes was downward, from the beginning of the observations at 11 a. m. until food was ingested at approximately 12:30 p. m. After the ingestion of food, there was a definite rise in the surface tem-

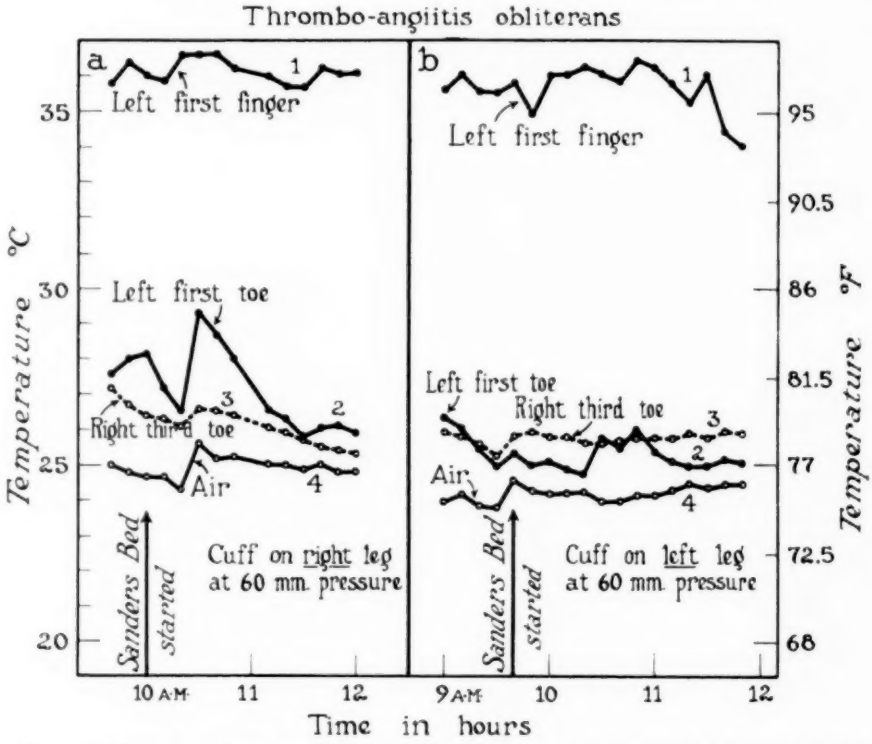


Fig. 8. — Effects of combined use of Sanders bed and intermittent venous occlusion on the surface temperature of the toes of the right and of the left foot of a patient who had thrombo-angiitis obliterans. The same conclusions which were drawn with reference to figure 7 also apply to this figure.

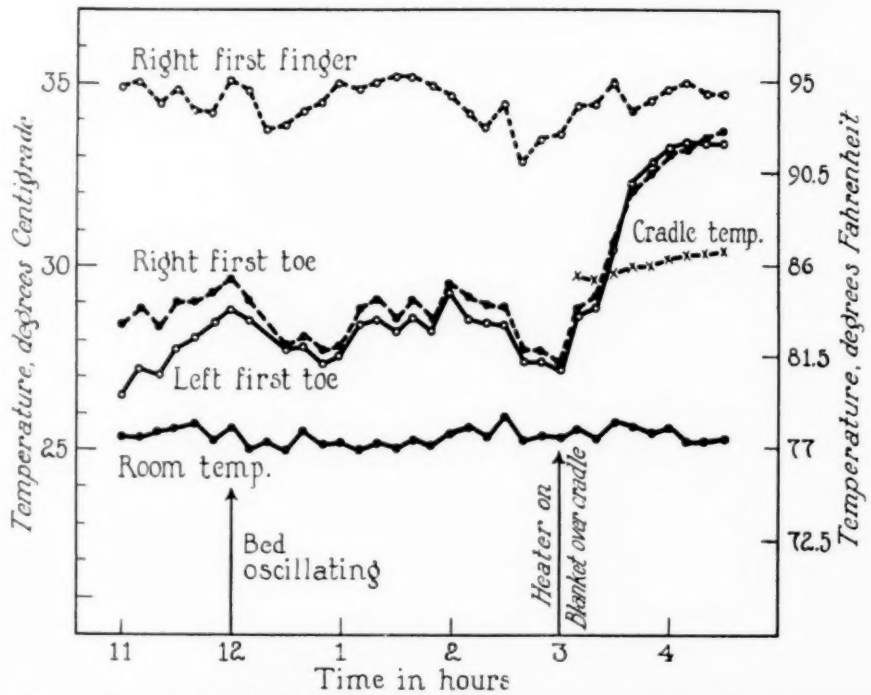


Fig. 9. — The use of the Sanders bed alone produces no rise in the surface temperature of the digits when the subject is without food and under basal conditions. A marked rise in surface temperature of the toes occurred when the environmental temperature (cradle temperature) of the feet was raised suddenly from 77 F. (25 C.) to approximately 80 F. (30 C.). The rise in surface temperature of the toes was due to the environmental temperature and not to the use of the bed.

perature of the toes. In previous publications, we have pointed out the effects of the ingestion of food on the rise of surface temperature of digits under various controlled environmental conditions. Unless one is aware of this fact, one is likely to attribute the rise in surface temperature of the digits to the use of the oscillating bed, when as a matter of fact it is due to the vasodilatation resulting from the ingestion of food in an environmental temperature of 25.6 C. (78 F.). It was the ingestion of food and not the effect

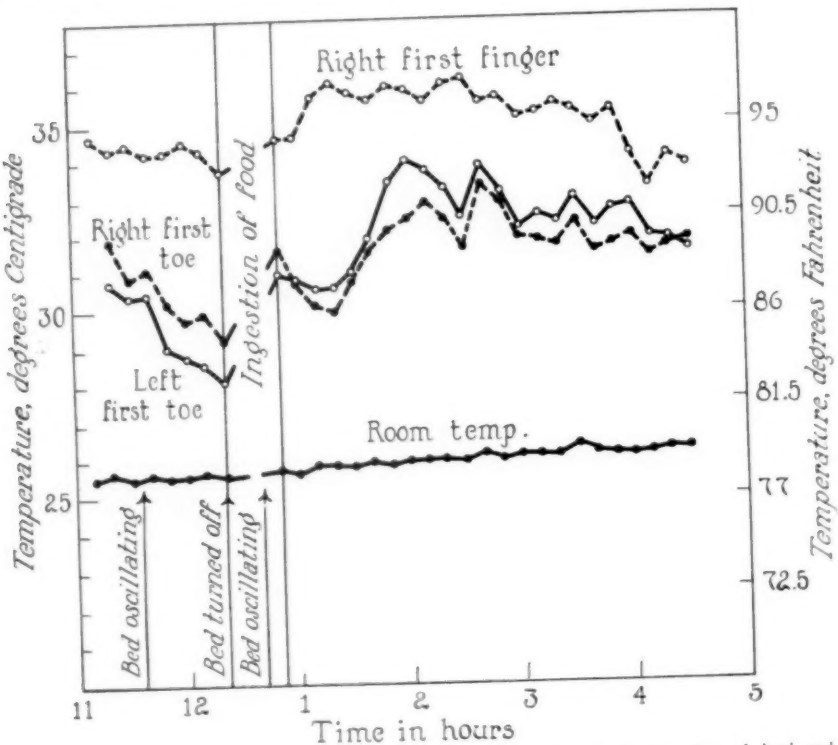


Fig. 10. — The rise in surface temperature of the digits was due to the ingestion of food and not to the use of the Sanders bed.

of the oscillating bed which accounted for the rise in surface temperature of the toes, as illustrated in figure 10. There was little effect of the ingestion of food on the fingers, for vasodilatation already had occurred spontaneously in the fingers, as a result of the environmental temperature of 78 F. (25.6 C.).

In all the observations which have been recorded the patient was in a basal metabolic state, that is, without food throughout the period of observation, and was under controlled environmental conditions, the environmental temperature being 78 F. (25.6 C.) unless otherwise stated. Unless patients under investigation are in the basal metabolic state and under controlled environmental conditions, one is likely to draw erroneous conclusions from the use of mechanical devices when evaluating the resultant rise in surface temperature of digits. Barker and Roth[15] studied the skin temperatures of six patients before and after treatment with the Sanders bed. Their patients had had either breakfast or lunch prior to starting the treatment and were not under controlled environmental conditions. Under the conditions of their study, they noted only a minor increase in skin temperature which, in the light of our later observations, must have been due to the ingestion of food and not to the use of the Sanders oscillating bed.

The Sanders bed (oscillating bed) is the simplest but undoubtedly the best mechanical device now in use for the treatment of subjects who have occlusive arterial disease of the extremities. In order to get the maximal benefit from the use of the bed, the patient should be kept in an environmental tem-

perature of 85 to 87 F. (29.5 to 30.5 C.), for under these conditions vasospasm disappears from the vascular tree, and the constant, rhythmic up-and-down tilting of the bed produces a maximal flow of blood through the collateral circulation. It is particularly of use in the treatment of occlusive arterial disease of the lower extremities. It will probably take the medical profession some time to realize this fact but eventually, we predict, this type of apparatus will be in general use in all the hospitals for the treatment of occlusive arterial diseases of the extremities. Furthermore, this type of apparatus lends itself perfectly to home treatment.

Comment

From the foregoing observations as well as from our clinical experience, we do not feel that the use of the pavex machine and the intermittent venous occlusion apparatus is capable of promoting increased blood flow in normal extremities, nor do we believe that such apparatus is of any definite value in the treatment of patients who have peripheral vascular disease. All the variations in the surface temperatures of the toes which we have recorded in the various graphs which have resulted in the course of use of the pavex machine and the intermittent venous occlusion apparatus can be accounted for by one or all of the effects produced by changes in environmental temperature. If one is to use any type of apparatus in treatment for peripheral vascular disease, we feel that this can be accomplished best by the use of an oscillating bed, provided that this is used in an environmental temperature of 85 to 87 F. (29.5 to 30.5 C.) at which level vasospasm ceases to exist in the involved extremities. Of all the various factors which influence blood flow to the extremities in both health and disease, environmental temperature is of paramount importance. This cannot be over-emphasized. Changes in relative humidity have little effect on temperatures of the skin of the extremities and thus do not influence flow of the blood to any measurable extent. Throughout this study we have assumed that when there was no increase in surface temperature, there was no increased supply of blood to the part in question.

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Discussion

Dr. Karl Harpuder (New York, N. Y.): I am sure you will agree with me when I say that the paper to which we have just had the privilege of listening is an excellent piece of careful, thorough and critical clinical research. I am glad to open the discussion the more so because from clinical and experimental experience I fully subscribe to the presented conclusions.

Dr. Stein of our department has observed in arteriographic studies on rabbits' ears, the appearance of vascular spasm under the suction pressure treatment. Our clinical results and observations of cutaneous temperature and skin color, although carried out routinely, did not encourage us to continue with paevex treatment except in a few special cases.

With intermittent venous occlusion we have seen only moderate results in cases of rest pain, or of pain on exercise and none at all in gangrene. Blood gas studies, examination of the oxygen and carbonic acid content of the venous blood and cutaneous temperature readings, did not show an increased blood flow during or after venous occulsion with pressures of 40 to 45 millimeters of mercury.

We are hesitant to use higher pressures because pressures above 40 to 50 millimeters of mercury apparently interfere with arterial flow. This is evidenced by the appearance of reactive hyperemia after release, first observed by Sir Thomas Lewis, and now used to supply a rationale for the intermittence of venous occlusion. I do not feel that we should interfere with arterial inflow in peripheral vascular disease, not even for the sake of producing reactive hyperemia.

We have seen good results with venous occlusion in subjects with clean, noninfected ulcers in peripheral vascular disease. These observations have been well controlled, so that I believe venous occlusion has an indication for certain cases of pheripheral vascular disease.

Frequently in such cases the same results have been obtained with Bier's passive hyperemia and with intermittent occlusion. There is no great difference between the two types of treatments except that you can apply Bier's hyperemia with a simple rubber bandage.

I would like to ask Dr. Horton one question. If you take the cutaneous temperatures in the suction pressure boot, does the movement of the air interfere with the readings in any way by evaporation of moisture from the skin, or not?

You know, and I am sure Dr. Horton knows better than the rest of us, the limitations of cutaneous temperature readings for the investigation of peripheral vascular disease and for evaluation of therapeutic measures. But I am fully convinced the excellent work which has been presented is a great step forward in gaining better knowledge concerning peripheral vascular disease and gaining necessary critical views on therapeutic measures which are in vogue and may or may not disappear with increasing knowledge.

Dr. Paul Merrell (Indianapolis, Ind.): Dr. Horton has been thorough and precise in presenting a series of experimental observations. His results are interesting to all who have been doing this work. In a paper presented previously I made a plea for an earlier diagnosis of peripheral vascular disturbances. The importance of the proper application of the boots for beneficial results was stressed.

In contrast to some of the conclusions of the speakers, I feel that mechanical apparatus, whether pavaex, intermittent venous occlusion or the Sanders bed is helpful for developing collateral circulation if used properly and over a sufficient length of time.

At the Indianapolis City Hospital during the past two and one-half years, we have treated 49 patients for a period over twenty hours each in the arteriosclerotic group, a total of 4,850 hours having been given, and of these 49 patients who had twenty or more hours using the pavaex machine only one required amputation. I feel, however, that patients can be helped and that it would be bad for the impression to be left that there is no help for them. May I stress that a combination of the mechanical, drug and surgical therapy, as stressed by Dr. de Takets, seems a logical means of managing this group of patients.

Dr. Samuel Silbert (New York, N. Y.): I have listened with great interest to the splendid paper presented by Dr. Horton, and I feel we are indebted to him for his

painstaking effort to evaluate some of the mechanical devices which are now advocated in the treatment of patients with peripheral vascular disease. My own experience with the suction pressure pump and the intermittent venous occlusion apparatus has also been disappointing, but I would not go so far as to say they are of no value. There is a danger in accepting Dr. Horton's premise that since vasodilatation cannot be demonstrated, these apparatuses exert no beneficial effect on the circulation. To do so would lose sight of the fact that the circulation in an extremity may be improved even though no vasodilatation is produced.

All of the methods discussed depend upon some obstruction to the outflow of blood from the extremity. This principle has been used for a great many years. In 1906 Oppel applied it surgically when he tied off the femoral vein on patients with impaired arterial circulation. During the World War it was found that when damage to a major artery necessitated ligation of such a vessel, the incidence of gangrene could be greatly reduced if the companion vein was tied off at the same time. Considerable animal experimental work by Brooks, Holman and others subsequently confirmed this observation. Some years ago I studied the effect of femoral vein ligation in a selected group of patients with peripheral vascular disease. I concluded that this procedure does not relieve rest pain or improve intermittent claudication, but that it does aid in the healing of ulceration. Thus there appears to be ample clinical evidence that obstruction of venous return does in some way aid the circulation.

The suction pressure apparatus, the intermittent venous occlusion apparatus and the Sanders bed all cause partial venous obstruction. The principle involved is no different from that utilized when the major vein to an extremity is ligated. In my experience the clinical results from these forms of treatment are approximately the same. They appear to be useful as an aid in healing ulceration. None of them seem to aid intermittent claudication and there is no evidence that any of them cause objective improvement in the circulation.

Since Dr. Horton's careful observations seem to indicate that no vasodilatation results when these apparatuses are employed, we must look for some other explanation of their value. An impaired arterial circulation results in a lower arterial pressure in the extremity, and in turn causes a lowered intracapillary pressure. When the capillary pressure falls below a certain level, osmotic exchange through the capillary wall stops. Venous obstruction results in increased venous pressure in the extremity, which dams back through the capillary system, causing increased intracapillary pressure. It is probable that this mechanism is responsible for a better osmotic exchange between the blood and the tissues, which in turn is responsible for improved healing of ulceration. It has been my experience that when these methods are used in properly selected cases they are of real help in the treatment of patients with peripheral vascular disease.

Dr. Joseph Kovács (New York, N. Y.): Inevitably, whenever a new procedure in therapy is developed and gains rapid popularity, it is apt to be employed beyond its indicated value. That is the reason I looked forward with great anticipation to hear the conclusion of the essayists of the usefulness of the different therapeutic devices which are used for the improvement of the blood flow of the extremities. I do not think that they have left much for discussion concerning the technic and the care with which all phases of the experiment were controlled. There remains only the basic question of discussion: Is surface temperature measurement the proper method for evaluating the circulation in the extremities? As an example take Raynaud's disease. Low surface temperatures are found, yet the oscillometric readings are normal. Here we have a deficient blood supply in the cutaneous capillary circulation, without significant changes in the blood circulation of the larger arteries.

Mechanical devices like pavaex, or intermittent venous occlusion, or oscillating beds, presumably increase the collateral circulation of the deeper tissues without increasing the cutaneous capillary circulation by relieving spasms and without increasing the circulation of the larger pulsating arteries. Improvement of circulation is due to the increased circulation of the nonpulsatiel element of the collateral vascular bed. I have only one suggestion to make. I think if the measurements of temperature are used as an index of blood flow to the extremities, these measurements should be taken not only on the surface but should be taken subcutaneously and intramuscularly. Perhaps changes of temperature of the deeper tissues will give an explanation of the beneficial therapeutic effects of this method.

Dr. Bayard T. Horton (closing): I am not going to argue any of the points which have been brought up. What Drs. Krusen, Sheard and I have said, will stand as is. (1) We have merely presented the results of carefully controlled experiments in an effort to evaluate some methods and mechanical devices for producing increased blood flow in the extremities. When we began the experiments, we had no preconceived ideas as to what the results would be, nor had we any favored mechanical devices which we wished to defend or exploit. In presenting the results we have attempted to present the truth. This should be the aim of every investigative effort. This is a free country, in which we live, and I am happy that this is true. (2) Physicians who wish to employ methods in the management of peripheral vascular disease, which differ from those which we use, are privileged to do so. In the course of time we will find out what the truth really is.

RHYTHMIC MOVEMENTS IN CHRONIC BACKACHE *

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It is intended in this paper to advance the hypothesis that in the presence of certain chronic spasticity of the lower back muscles rhythmic movements may be of value in relieving the spastic condition and in reestablishing a normal state of neuromuscular coordination. By no means is it intended to convey the impression that this theory is applicable in all cases in which these conditions prevail. Accordingly organic lesions such as arthritis, tuberculosis of bone, fractures, dislocation, spondylolisthesis, tumors or radiating pain originating from renal, vas deferens, pelvic, abdominal and other demonstrable lesions will not be discussed. Our effort will be directed more specifically toward discussing a condition which cannot be included in any of the previously mentioned diagnoses and which seems to defy a definite classification. It is commonly called a static or chronic backache, an expressive though not a good scientific term.

A patient with this condition was referred to me some years ago and was a direct incentive for pursuing a study of the possible causal factors of the chronicity in the absence of all possible demonstrable signs and symptoms. He was a middle-aged muscular man and had been suffering with chronic lower back pain for over three years. He had been under observation and treatment by some of the best known orthopedic surgeons in the United States and abroad without avail. During this time he had worn jackets and splints of various kinds and had performed building-up exercises intended to strengthen supposedly weak back muscles. He found it impossible to drive his automobile, and he could not sit in other than a straight hard chair without having pain. He was almost wholly incapacitated, and was utterly dejected and despondent regarding the outcome. Examination revealed a situation familiar to all whose prerogative or misfortune it is to treat such patients. The back was stiff and limited in motion in the various directions but especially in the forward bending of the trunk. He exhibited extreme hesitancy when asked to pick up an object from the floor, which he could do only by slowly bending his knees and with obvious difficulty. There were no especially painful spots, but rather a constant and distressing ache covering the area of the lower back. Further usual orthopedic examinations gave negative results, as did roentgenographic studies. The question as to why he should continue in this deplorable condition in spite of the best medical advice presented a challenging problem, the answer to which rested on several factors, all centering on the musculature, pain, spasm and incoordination.

Though the causes of pain are many and all cannot be listed, it seemed plausible in this instance to assume that a number of factors might well play a part.

Spasticity of the musculature itself, that is, its being in a state of almost constant contraction perhaps because of overstimulation of propreoceptive stimuli arising within the muscular tissue, is regarded by many, as a cause of pain. This fact may be tested by holding one's arm at an abduction position of 90 degrees for three to five minutes, when the sensation of ex-

* From Barnes Hospital.
* Read at the Southeastern Sectional Meeting of the American Congress of Physical Therapy, Chattanooga, Tenn, May 26, 1941.

treme fatigue will be augmented by pain. It is recognized that ischemia of the muscle may cause pain because of accumulated metabolic by-products, which, under normal conditions of intermittent contraction and relaxation, are washed away. It must be assumed that a spastic muscle is a prime cause of ischemia of the muscle. Again, it is well known that constant pulling of a muscle at its insertion may produce a local tenderness, as exemplified by the painful area at the insertion of the deltoid muscle in the presence of bursitis or injury to the joint. Also, because of improper action of the hip girdle muscle in an effort to relieve discomfort of the back an undue strain is placed on ligaments and their insertions, producing mild periostitis. These various elements are believed to be some of the causes of lower back pain. If this is so, it follows that the first objective must be the relief of muscular spasm. This can be alleviated by proper application of heat and use of massage, which I regard as the first line of attack. The second, not so well known, is to apply measures which will have as an aim the reestablishment of normal neuromuscular action of the lower back muscles. This may appropriately be called muscular cooperation. Before elaborating this point, however, it is necessary to digress and to inquire into the cause for the spastic condition of the back muscles, which to my reasoning is the crux of the chronic state of the lower back.

So that the role that proper exercise takes in this matter may be better understood, it becomes necessary to antedate one's reasoning to the time of the initial injury sustained by the patient. It matters little what caused the injury, but much, what followed. The history tells that for years the patient was subjected to considerable immobilization, followed by a program of miscellaneous exercises, including trunk forward-bending, despite the fact that the overworked spastic muscles were not in need of strengthening. Under normal conditions forward bending of the trunk is accompanied by relaxation of the extensors of the lower back muscles, but in this instance the spastic muscles do not relax. The active contractions of the hip flexors, aided by the gravity of the trunk, are operating against a contracting lower back extensor group. The difficulty of such a movement is evidenced by the hesitation and degree of awkwardness with which the patient performs the act. It is during forward bending of the trunk that the patient frequently experiences a "slipping" somewhere in the back and has great difficulty in regaining the erect position. It is our belief that during this movement minor injury is done to individual muscle fibers, accompanied by capillary hemorrhages, followed by repair and leading to a form of fibrosis which in turn is a prime factor producing spasm of the muscles. This frequent and intermittent process of recurrent injury is, in our judgment, prima facie evidence of the chronicity of the particular type of lower backache which forms the basis of this discussion. It should therefore not be difficult to understand that not only is trunk bending excluded from the program of exercise but the patient is positively forbidden to bend his trunk forward under any condition. Instead he is advised to flex his knees.

Treatment

In the course of treatment the patient is subjected to a thorough heating of the muscles, either by means of hot fomentations, diathermy or infrared radiation, followed by a Scotch douche (the alternate spraying of hot and cold water against the back) and gentle stroking massage. This is followed by a plan of slow rhythmic movements, involving particularly the trunk muscles. These movements are arranged progressively from the simple to the more complex. Here the object is not to increase, strengthen

or tone the muscles, for, as has been stated, the muscles are already of unusual strength and tone. We strive instead to bring about relaxation of the muscles and, of equal importance, proper coordination, so that the patient, when making a movement without previous deliberation, will not find his muscles in a state of unpreparedness.

An example of such an exercise is the taking by the patient of a stride position, bending slightly forward and swinging, rather than raising his arms, to and fro by means of the lateral trunk muscles. It is essential that the patient be told the motive governing the exercise; that it is not an attempt to raise the arms shoulder high by means of the muscles of the shoulder, but rather that the arms should be relaxed and flung, much as a pendulum swings, from side to side. I ask the patient to imagine, for the moment, that the muscles of the shoulder are paralyzed, thus eliminating all possible muscular contraction of these muscles. The problem then is so to manipulate the trunk as to throw the arms shoulder high. The result is a smooth, rhythmic lateral motion of the body, swaying from right to left, with arm flinging in the direction of the lateral motion of the trunk. The patient performs these rhythmic movements, three, four or ten times a day at home, doing each for from two to five minutes. The intensity is increased gradually, but never beyond the point of fatigue. The patient also is encouraged to do ball room dancing, clog dancing or other types of rhythmic movements. Swimming in water not too cold is permissible.

It is noted that walking on cement sidewalks irritates the condition, whereas walking on uneven and soft ground is beneficial. The former is mostly an automatic movement of the legs while the muscles of the back receive very little opportunity for the desired regular intermittent contraction and relaxation.

Bending forward to pick up an object is almost an automatic movement. This exercise, as has been stated and is repeated for emphasis, is not to be allowed. As a substitute we teach, and most patients need to be taught, to bend the knees whenever it becomes necessary to reach forward, as, for example, to tie one's shoe. The proper way to do deep knee bending is to separate the knees, not to keep them parallel as is so often done. It is believed that if a person once has learned to do this properly it may soon become a habit and a substitute for forward bending.

In the presence of lordosis we include in the program suitable exercises for the abdominal and gluteus maximus muscles. Also, when indicated, proper exercises are prescribed for stretching shortened anterior and lateral fascia lata, the contracted heel cord and the erector spinal muscles.

Summary

We have described and proposed a reason for a rhythmic form of movements and recommend those which from experience have been of great help in relieving the spasm and reestablishing the neuromuscular coordination of the muscles low in the back.

In the presence of spasm of these muscles forward trunk bending may logically be regarded as a factor producing a state of chronicity of the lower back.

HYPERPYREXIA AND THE SPECIFIC GRAVITY OF BLOOD *

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Several investigations[1-2-3-4] have been made on the relation between hyperpyrexia and hemoconcentration. These have been made chiefly on animals, and a few have been made on human subjects. In an earlier communication[1] red cell count was reported as an index of blood concentration. The following study was undertaken to determine the validity of those observations.

Several workers[1-5-6-7] have explained the blood count changes as due to concentration phenomenon. Decreases in plasma volume have been observed after artificially induced fever in animals.[8] Gibson and Kopp[9] have demonstrated decreased blood plasma volume, as well as decreased total blood volume, after induction of fever with foreign proteins, application of "conventional diathermy" (cuff technic) and use of the Kettering hypertherm or radiant heat cabinets.

Methods. — Thirty blood density determinations were made on 11 patients by means of the Barbour and Hamilton[10] falling drop method.

In addition, forty determinations on the percentage change of blood solids were made on 10 patients — only 1 of whom was included in the specific gravity determination. The following method was used: A special filter paper was cut into strips 26 mm. wide. These were immersed in acetic acid and then in distilled water at 122 to 140 F. and were dried at room temperature. They were then cut into pieces 16 by 26 mm. and placed in a weighing phial, glass stoppered. The phial was placed in an oven for one hour at 212 F. and then weighed. Blood was placed in sufficient amount to be completely blotted up by the filter paper and weighed again. Finally, after drying in an oven at 212 F. for an hour, it was weighed again. The percentage difference of the weight before and after drying was recorded during the various phases of the treatment, as described.

All the patients were suffering from arthritis. The rectal temperature was elevated to 104 F. by means of the inductotherm and fever cabinet in approximately one to two hours and was maintained at this level for four hours, when it was permitted to return to its prefebrile level. The experiment required from seven to eight hours.

A 4 per cent concentration of sodium chloride was given by mouth. The amount and rate of administration were regulated solely on the basis of the physician's judgment as to the patient's requirements.

Blood was drawn from the median basilic vein of the arm with the usual care and was tested immediately. Determinations were made just prior to treatment, when the patient's temperature reached 104 F.; four hours later, and, finally, after the temperature had returned to normal, usually three hours after the four hour febrile period.

Results. — Tables 1 and 2 give a summary of the average values and the results of a statistical analysis. There was a significant change in the percentage change in blood solids (table 2) throughout the entire febrile period which is probably due to inherent errors of the method. The falling drop method is more reliable. The greatest change in blood density occurred during the induction of fever, but as the only significant figure was in the fourth decimal place, the change was considered insignificant.

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Comment. — According to Howell[11] the specific gravity of human blood may vary from 1.041 to 1.067, the average being 1.055. All of these determinations came within this range. Investigators agree that artificial fever produces an increase in the number of red cells in the blood; therefore, it was not considered necessary to make red cell counts simultaneously with determinations of the specific gravity of the blood.

Gibson and Kopp[9] stated that one of the major physiologic effects of artificial fever induced by physical means is a diminution in the circulating blood volume. The authors stated this is caused by an uncompensated loss of large quantities of water from the blood stream. This they believe brings about a reduction in the plasma portion of the blood with a consequent increase of blood density, which is further augmented by small increases in the number of circulating red cells. They further stated that the degree of reduction in plasma volume is determined by the difference in rate of excretion by skin, lungs and kidneys and of effective absorption of the fluids administered. If insufficient fluids are administered, the tissue fluids of the body are drawn on for the maintenance of plasma volume, with resultant dehydration. These observations showing that there was no significant change in the specific gravity of the blood indicate that there was no marked change in total blood volume. This discrepancy may be due to the difference in the two methods of producing and maintaining fever. By the combination of electromagnetic induction and high humidity of the fever cabinet it was possible to use low environmental temperatures (cabinet temperature) in contrast to higher environmental temperatures used by Gibson and Kopp.

TABLE 1. — *Summary of Blood Density.*

	Elapsed Time, Hours	Average of 30 Determinations	$\sigma \pm$	2σ Diff $\pm$	Change Over Control $\pm$
Control	0	1.0536	.0005	—	—
Temperature reached 104 F.	2	1.0555	.0007	.0018	.0019
4 hours of temperature at 104-104.6 F.	6	1.0552	.0007	.0018	.0016
Temperature returned to normal.	8	1.0544	.0009	.002	.0008

TABLE 2. — *Summary of Percentage Change in Blood Solids.*

	Elapsed Time, Hours	Average of 40 Determinations	$\sigma \pm$	2σ Diff $\pm$	Change Over Control $\pm$
Control	0	18.85	0.17	—	—
Temperature reached 104 F.	2	19.52	0.24	0.62	0.67
4 hours of temperature at 104-104.6 F.	6	19.70	0.27	0.64	0.85
Temperature returned to normal.	8	19.58	0.39	0.84	0.74

Undoubtedly the blood density will be dependent on the balance of fluid loss and fluid gain, and one might readily criticize this work because these variables were not controlled. As stated, fluids were given in regard to both quantity and rate according to the patient's need. However, as can be seen from the data, the total amount of fluid ingested by each patient did not vary a great deal. The primary object was to ascertain changes in blood density under conditions of the therapeutic regimen. It is well known that blood density is increased with fever when no fluids are given. The rate and the degree of fluid absorption undoubtedly is not the same in each patient, and this factor alone would be difficult to dispose of with ease. Another extremely variable factor is the amount of perspiration, which will vary not only from patient to patient but with the same patient from treat-

ment to treatment.[12] Gibson and Kopp[9] stated that water may pass out of the blood stream more rapidly than it can be absorbed from the intestinal tract, and this fact has an important bearing on the determination of the optimal rate of the administration of the fluid. It is interesting that these workers found a direct relation between the gross water loss and the environmental temperature (cabinet temperature) of the patient. The water loss was greatest in patients in which the differential temperature between the patient's body and his environment was highest and was least in cases in which the differential temperature was lowest. This observation is confirmed. The insignificant changes which occurred in the specific gravity of the blood of these patients now reported may be explained in part as due to the lower cabinet temperatures maintained. Gibson and Kopp reported temperatures somewhat higher than those used in this report.

Summary and Conclusions

A temperature of 104 F. maintained for four hours was induced in 10 patients by means of the inductotherm and the heat-insulated cabinet. Fluid containing sodium chloride was administered in amounts and at a rate determined to be proper by experience.

Once the temperature plateau was reached, the patient's environmental temperature was usually maintained below, or at, the level of the rectal temperature. This is believed to be of considerable importance.

Thirty determinations of the specific gravity of the blood and forty determinations on the percentage change of blood solids were made. These were made before induction of fever, at the temperature plateau, four hours later, and, finally, when rectal temperature had returned to normal. No significant changes in the specific gravity of the blood were found.

Apparently increased blood density is not the mechanism responsible for the changes occurring in the blood cell count when adequate fluids are administered during the course of treatment.

Therefore, from the experimental data obtained in this investigation, it is obvious that there are definite advantages in the method which requires the lowest environmental temperature for the induction and maintenance of the desired fibrile plateau.

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LOW BACK DISABILITIES *

P. M. GIRARD, M.D.

DALLAS, TEXAS

In this day of complicated insurance laws, compensation adjustments and the desire of practically every one to get something for nothing, one must be somewhat of a detective in order to diagnose properly, evaluate and treat low back disabilities. There is also a rather large number of unscrupulous lawyers who recognize the confusion the medical profession seems to be in with regard to evaluating these injuries properly. Such lawyers have been know to coach patients as to how they should behave during the examination and as to the areas in which to complain of pain.

Pain in the lower part of the back is a common cause of disability. In frequency it rivals headache or gastric symptoms, and it demands as comprehensive study as does either of these. In approaching the problem, the examiner should have in mind the possible conditions for which he should look.

Differential Diagnosis

There are two common classifications of pain low in the back. One is based on the type of pain, whether referred or localized. The other is anatomic and is based on the joint involved. In referred pain, nerve impulses from an involved viscera travel to a spinal segment and are correlated with nerve filaments which supply certain areas of the skin. Because of a "physical error in judgment" the patient considers the pain as being in the area of the skin rather than in the viscera where it is actually located. Visceral infection, either pelvic or abdominal, usually refers pain to the lower and middle portions of the sacrum. In prostatic or rectal involvement, the pain is commonly referred to the floor of the pelvis, and in disease of the kidney, to the groin. When the skeleton or the supporting muscles and ligaments are involved, the pain is usually in the sacroiliac joint, the lumbosacral joint or the posterior spine of the ilium. In such cases pain is usually radiated down the posterior aspect of the thigh to the knee or to the posterior and lateral sides of the heel. The etiologic classification of pain of the lower part of the back is more fully presented in the following outline:

I. Localized pain
  A. Lumbosacral joint area
    1. Mechanical
      a. Postural strain
      b. Trauma
      c. Congenital anomalies
    2. Infectious
      a. Arthritis
      b. Osteomyelitis
      c. Tuberculosis
    3. Neoplasms
  B. Sacroiliac joint area
    1. Mechanical
      a. Postural
      b. Trauma (pregnancy)

* Read at the Southern Sectional meeting of the American Congress of Physical Therapy, Fort Worth, Texas, May 12, 1941.

2. Infectious
3. Neoplasms
   a. Primary
   b. Metastatic

C. Supportive structures (muscle, ligament, fascia, ligamentum flavum)
1. Mechanical
   a. Postural strain
   b. Traumatic
2. Infectious
3. Neoplasm
   a. Lipoma
   b. Fibromatosis (von Recklinhausen disease)

D. Intervertebral disk lesions
1. Mechanical
   a. Postural strain
   b. Traumatic

II. Referred pain
A. Neurologic lesions
1. Mechanical — cord tumors
2. Infectious — intraspinal
3. Neoplasms
4. Functional — hysteria

B. Visceral
1. Abdominal
   a. Mechanical — inguinal hernia
   b. Infectious — appendicitis
   c. Inflammation of the gastrointestinal tract
   d. Neoplasms
2. Genitourinary
   a. Mechanical — stone
   b. Infectious
   c. Neoplasm
3. Pelvic
   a. Mechanical — retroversion uterus
   b. Infectious
   c. Neoplasm — ovarian cyst, etc.

Every patient should be examined with the idea that he actually has a disability, and hysteria or malingering should not be considered until all other possibilities have been excluded. A history negative for trauma is of questionable importance, as a slight twist, such as swinging a golf club or making a misstep, often is sufficient to produce disabilities of the lower part of the back. With such a history one should suspect possible tear of the muscle, rupture of the ligament or injury to the facet. If a patient claims to have fallen in a sitting position, one should suspect possible coccygeal injury or damage to the intervertebral disk. Injuries to the disks may also result from flexion type trauma which causes undue strain on the annulus fibrosus and may force the nucleus pulposus to protrude into the spinal canal or into the body of a vertebra.

In cases of chronic backache without a history of injury, a narrowing of the space between the last lumbar vertebra and the sacrum may be observed. The usual cause of this condition is poor posture which permits excessive wear on the posterior portion of the disk with a settling of the facets. The strain on the facet joints frequently causes arthritic changes to occur. Sometimes actual impingement on the nerve root is present, either

from arthritic condensations on the facet edges or from partial closure of the foramen by the overriding facets. Persistent stretching of the ligaments of the facet joint under these circumstances may produce pain.

In cases of infected tonsils, teeth or sinuses one thinks of an arthritic condition, usually located in the facet joints. The hypertrophic arthritis of older persons ordinarily does not cause pain when the process is limited to the vertebral bodies. If the process is in the facet joints, however, pain is the rule. In instances of tuberculosis of the spine or osteomyelitis of the

Fig. 1. — Failure of fusion in pedicle of 5th lumbar (oblique facet view).

body of a vertebra an appropriate history is usually given. When a tumor of the bone is present in a vertebra a history of trauma with fracture through the involved area is common. When tumors of the spinal cord occur there is a gradual onset of paralysis below the spinal segment involved. The peroneal muscles are most frequently affected, resulting in a characteristic limp. Disturbance of control of the sphincters of the rectum and bladder may also be present.

Congenital anomalies in the lumbrosacral joint are frequent and are thought to be due to the changing status of this joint from quadruped gait

to the biped upright position. If a large tuft of hair is noted in any part of the back a congenital anomaly should immediately be considered. If one such anomaly is seen, such as a spina bifida, either manifesta or occulta, other congenital anomalies are apt to be present. These may be faulty fusion of the tip of a facet or an abnormally placed facet between the fifth lumbar vertebra and the sacrum. Another common congenital anomaly is a failure of fusion of the pedicles of the fifth lumbar vertebra (fig. 1). When this condition is present only slight trauma is required to produce a separation of the pedicle from the body of the vertebra, with gradual slipping forward of the fifth lumbar body, resulting in either prespondylolisthesis or true spondylolisthesis (fig. 2).

Fig. 2. — Spondylolisthesis (5th lumbar forward on sacrum).

Anatomic Examination

In addition to a general physical examination, the investigation of the lower part of the back requires that the patient be studied carefully while in three positions — standing, sitting and recumbent.

Standing. — The patient, stripped, stands with his back to the light. The spinous processes of all the vertebra below the sixth cervical are marked with skin pencil and the sacrum is outlined. A plumb line is dropped from the seventh cervical spinous process, and its relation to the pencil line and the sacrum are noted. Any deviation from the normal is recorded. If the line swings away from the center of the sacrum, this may indicate a short leg on that side. Also a congenitally large transverse process of the fifth lumbar vertebra may be impinging on the top of the sacral wing. Bending forward, backward, to the right and to the left should be tested. If a lesion of the lumbosacral joint is present muscular spasm in the lower part of the back will cause the spine to bend at a higher level than normal, the motion occurring above the second or the third lumbar vertebra. The presence of muscular spasm and a definitely abnormal bending level are important objective signs, indicating that the back is actually injured, or rather that genuine pain is present.

The patient is then requested to indicate with one finger the exact site of his maximum pain. The examiner determines by deep palpation the points of tenderness over the muscles, ligaments and bony structures of the entire spine. If the area of greatest tenderness corresponds to the area in-

dicated by the patient additional confirmatory evidence of localized pathologic change is obtained.

Sitting. — The patient sits on the edge of the table with his spine flexed and his feet on a stool. His shoulders are twisted to the right and to the left. When he is turned to the right, the right facets in the lower part of the spine are opened. If they are involved the patient will feel pain immediately over this area. On his being twisted to the left the left facets will likewise be moved. If the facets on the right side are injured, bending to the left does not produce pain, as the facets in this position are locked.

Recumbent. — With the patient lying supine several maneuvers are done to test specific joints. The straight leg-raising test is done by elevating the leg with the knee in full extension while the opposite leg remains flat on the table. Limitation of this motion accompanied by pain is indicative of pathologic change in the lumbosacral joint. In the literature it has been said that this test has been found useful in locating sacroiliac lesions, but in my experience it is more valuable when used as described. Lumbosacral pain may be further evaluated by flexing both hips and knees on the abdomen and then twisting the pelvis to the right and to the left.

The cross knee test is performed by placing the ankle of one leg across the knee of the opposite extended leg. Then pressure is exerted on the flexed knee by one hand while the opposite side of the pelvis is held flat by the other hand. This produces a torsion type motion in the sacroiliac joint on the side of the flexed knee with resultant pain and limitation of the extent to which this knee may be depressed when a pathologic change exists in the joint. In further testing this joint for painful motion the patient is moved over to the edge of the table so that the hip may be hyperextended while the opposite leg is held acutely flexed on the abdomen.

In testing for tightness of the fascia lata on the left the patient is turned on his right side with the right hip and knee flexed. The left hip is hyperextended and the left knee is flexed to a 90 degree position. If this structure is not abnormally tight the left knee drops promptly to the table level.

The length of the leg is determined by measuring the distance from the anterior superior spine to the medial malleolus. Also the circumference of both thighs and calves should be measured and recorded. The measurements demonstrate the actual atrophy of the muscle which may have resulted from prolonged disuse. Evidence of interference with the nerve supply to these muscles may be obtained by testing for muscle weakness in the lower extremities.

Neurologic Examination

A thorough neurologic examination is essential in the study of disability of the lower part of the back. It should be done with great care, as significant information may be obtained in localizing spinal lesions. A neurologic chart should be available in each examining room. Sensation is tested with light cotton touch and by pinpoint. Slight changes over the outer side of the thigh or outer side of the calf are considered normal, as the skin over these areas is slightly tougher than elsewhere. Attention is directed toward testing the inner and outer sides of the calves, under the medial malleolus, on the dorsum and outer sides of the foot and over the dorsal base of the great toe, as these areas represent definite segments of the spinal cord. Sensation over the saddle area should also be tested, because change in sensation in this region may be the result of a spinal cord tumor.

TABLE 1. — *History and Examination: Lower Part of the Back.*

I. Name:	Age:	Sex:	Date:	Case No.
Occupation:				
Chief complaint:			Duration:	
Family history: Back trouble:	Arthritis:		Malignancy:	T. B.:
Past History:				
Previous injuries:				
Previous static complaint (foot or postural):				
Previous visceral pathology:				
Other complaints (arthritis — joint — etc.):				
Previous back complaint (No. of attacks, duration, etc.):				
Present Complaint:				
Cause:				
Course (better or worse):				
Type of pain (referred, intermittent or constant):				
Effect of postural alterations: Relief from rest in bed:				
Relief from drawing up legs:				
Relation to menstrual function:				
Effect of coughing or sneezing:				

Deep reflexes, principally the knee and ankle jerks, should be checked carefully. The heel jerk is elicited with the patient lying prone, knee flexed, and with slight pressure of the examiner's hand against the forepart of the foot in order to tighten the Achilles tendon. This test is of special interest because a unilateral absence of this reaction brings up the possibility of a protrusion of a nucleus pulposus with pressure on a nerve root. The Rhomberg, Babinski, ankle clonus and cremasteric reflexes are also tested.

On completion of this examination one should have a fairly accurate diagnosis. Roentgenograms are then made to support this tentative opinion. Roentgenograms should not be taken before a thorough clinical examination has been made; they should be used only to support or confirm the clinical diagnosis. Routine roentgenograms of the lower part of the back consist of a stereo anteroposterior, a lateral standing and two oblique views, all being centered at the lumbosacral joint. Tables 1 and 2 give in detail the method of taking the history and making the physical examination.

Treatment

The treatment, of course, depends on the history and the clinical and roentgenologic findings. For instance, a man while carrying a heavy load stumbled and immediately felt a slight pain in his back. He was able to continue his work that day but his back was so painful in the morning that

TABLE 2.—*Outline for General Physical Examination.*

General Physical Examination:

Signs of arthritis in any joint especially feet and hands:

Teeth: Throat and Sinuses: Heart and Lungs:

Blood pressure: Abdominal:

Pupillary reflexes:

I. Standing:

Gait:

Lateral view:

Elevation shoulder:

Elevation one side of pelvis:

Rotation of vertebrae:

Points of tenderness to pressure:

Maximum:

Others:

Muscle Spasm:
(Location)

POSTERIOR VIEW

Forward bending: Backward bending:

Bending to right: Bending to left:
(Specify at which level spine bends and extent. Keep feet flat on floor, knees extended.)

Feet:

Position:

Flexibility:

Circulation:

II. Sitting:

Bending forward: Backward: To right: To left:

Twisting to right: Twisting to left:

III. Recumbent:

Prone:

Straight leg raising: right: left:

Supine:

Pressure on iliac crests:

Pressure on symphysis:

Straight leg raising: right: left:
(Specify degree position which leg can be carried.)

Flexion both knees and both hips on abdomen:

Cross knee test: right: left:

Inward rotation of hips: (tight pyriformis)

Hyper extension of hips: right: left:

Contracted fascia lata test: right: left:

Length of legs: right cm. left cm. (shortening right) left)

Circumference of thighs: right: left:

Circumference of calf: right: left:
(15 cm. above patella)

Muscle weakness:

IV. NEUROLOGICAL: Sensation:

Light cotton:

Pin point:
(Test legs and saddle area)

Reflexes:

Knee jerks: right: left:

Heel jerks: right: left:

Babinski: right: left:

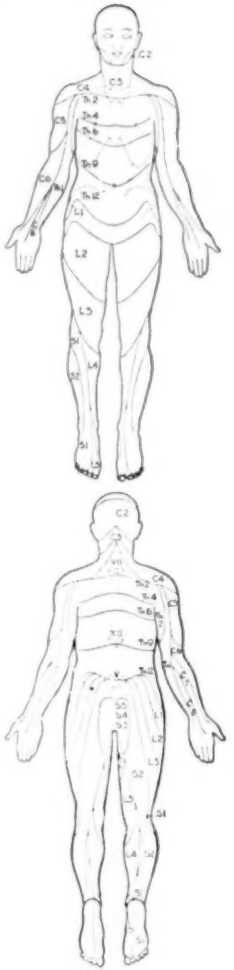
V. Rectal and vaginal examination when indicated:

VI. Tentative Clinical Diagnosis :

VII. X-Ray: (Usually Stereo AP I.S. Lateral and Oblique.)

VIII. Laboratory work indicated:

IX. Miscellaneous:



he was unable to arise. The probability is that he was suffering from a tear of the muscle. Much loss of time due to chronic disability could be averted if such a patient is put to bed, with boards under the mattress, for ten to fourteen days, and infra-red heat applied. On becoming ambulatory the patient may be allowed to resume work, but the back should be protected by a high heavy-stayed corset. Similarly, a man lifting a heavy timber while stooping in a twisted position feels a definite snap in his back. He has probably sustained a ruptured ligament or an injured facet. He should be treated with appropriate rest, heat and immobilization for three to eight weeks, depending on whether a fracture is present. The high incidence of "railroad spine" is due largely to improper diagnosis and treatment of the condition early in its course.

In a chronic condition, if one leg is short, a lift on the shoe frequently gives considerable relief. This may be used as well as a corset.

The corset should always reach high on the ribs posteriorly and have heavy stays for limiting motion in the lumbosacral joint. A sacroiliac belt is effective only when the sacroiliac joint is affected and should never be used to treat lumbosacral involvement, as it does not immobolize this area. An aluminum or steel brace, or a plaster cast may be used.

When there is bad posture with narrowing of the posterior portion of the lumbosacral joint, exercises and proper posture are indicated. The patient should be instructed to test his position by standing with his back against the wall. If he is unable to pass his hand between the lower part of the back and the wall, he is considered to be standing properly. Exercises of the abdominal muscles should also be given. Such patients are usually much more comfortable when lying on a firm bed; therefore, they are usually instructed to place boards between the mattress and the springs.

Many authorities believe there is a definite place for manipulative procedures in the treatment of pain low in the back. No manipulation or operative procedure should be done until conservative treatment has been tried for two to three weeks, and not then until there is no evidence of lesions of the bone, such a fracture, or congenital anomaly. If after adequate rest, heat, massage, etc. (for two or three weeks) there is still fixed lordosis in the lumbar region and the straight leg-raising test is positive, manipulation with the patient under gas anesthesia may be done for the purpose of stretching the tight muscles and fascia of the lower part of the back.

Congenital separation of the pedicle of the fifth lumbar vertebra (spondylolisthesis), compressed fracture, tuberculosis of the vertebrae, low grade arthritis limited to the area or persistently weak muscles which cannot be toned up by exercises usually require operative fusion, a fusion of the fourth and fifth lumbar vertebrae to the sacrum. The total disability following such a surgical procedure is about six months, followed by six months of partial incapacity. By using a transverse incision across the lower part of the back, adequate bone can be obtained from the posterior spine of the ilium for the fusion, without using any additional bone from the tibia. This procedure has the added advantage of stripping the muscles from the posterior part of the ilium, which further insures relief from the painful condition by giving relative increased length to the muscles.

A large number of surgeons in this country are now refusing to perform spinal fusion operations in compensation cases until final settlement has been made. This is probably a wise stand to take, as a fairly large number of patients, even after fusion has been obtained, are afraid to accept settlement because of the occasional pain in the back due to adhesions, limitation of motion and arthritic changes in the facet joints.

Evaluation of Disability

In cases of muscular spasm with high bending of the spine, a definite disability should be considered. If no structural changes are found, immobolization or some of the other methods of treatment mentioned should usually give relief in the course of a few weeks. If structural changes are found, such as a facet injury or spondylolisthesis, then usually a fusion is required and the disability should last approximately one year, followed by a 10 per cent partial permanent disability.

Summary

Pain low in the back is a common cause of disability.

The etiologic factors are discussed and a classification given.

The importance of adequate history taking is emphasized.

Physical examination should be done with the patient in three different positions — standing, sitting and recumbent. Various diagnostic procedures commonly used to indicate the areas involved are described.

Treatment is divided into conservative, manipulative and operative.

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MOTION PICTURE THEATER

During the week a motion picture theater will be conducted under the direction of DR. NORMAN E. TITUS, Chairman, Motion Picture Committee. Films dealing with physical therapy problems, especially technic, will be shown at various times to be announced. These films will prove highly instructive for those registered for the course of instruction. Arrangements for the showing of films should be made with DR. NORMAN E. TITUS, 730 Fifth Avenue, New York, New York.

ARCHIVES of PHYSICAL THERAPY
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.·. EDITORIALS .·.

THE 20TH ANNUAL CONVENTION IN WASHINGTON

The twentieth annual scientific and clinical session of the American Congress of Physical Therapy will be held at The Mayflower in Washington, D. C., September 1 to 5. The plan for this year's meeting again provides that both the instructional course and the scientific program will be held during the same week. The lectures will be given during the morning, and the papers and addresses will be read and discussed afternoons and evenings.

The American Occupational Therapy Association meets for its twenty-fifth annual session on September 1 to 5 at The Mayflower, Washington, D. C. A joint meeting of the two societies will be held on Wednesday afternoon, September 3.

The Instruction Seminar

Forty-eight lectures and demonstrations, dealing with every phase of physical therapy, will be given by prominent specialists. The plan is elective, so that only those courses need be pursued which appeal to the participant. The lectures this year have been arranged so that two types are available, elementary and advanced. For detailed explanation of the lectures see the program in this issue and page 243 of the April, 1941, issue of the *Archives of Physical Therapy*. Twelve lectures comprise a complete schedule.

The course is open to physicians, for whom it is primarily intended, but technicians who are properly vouched for also may attend by payment of the regular fee. It is not necessary for a physician to be a member of the Congress in order to be eligible for attendance at either the course or the convention program. It should be understood that while there is a registration charge for the course, there is no fee for attendance at any of the scientific sessions.

The Scientific Program

The convention program itself has been prepared with great care. There will be no special sections at this year's meeting. All papers will be presented at the general sessions. In order to have adequate papers presented a slight change was made in the program for the afternoon sessions. Three papers will be given without discussion followed by an intermission after which papers will be presented with discussion. The committee had endeavored to cover the field as thoroughly as possible, but obviously certain subjects could not be included even though their importance was appreciated.

The formal opening will take place on Tuesday evening, September 2. We shall have welcome remarks from representatives of the medical society, the medical schools of Washington, D. C., and the Federal Services of the Army, Navy, Veterans' Administration and Public Health Service. This will be followed by the induction of the President-Elect and a paper by an outstanding authority.

The Thursday evening session likewise has been prepared with discretion. Here again, if one refers to the program elsewhere in this issue, one cannot but be pleased with the selection of the speakers and the appealing subjects. Every physician whether in general practice or in a specialty

should hear these papers. They will prove informative, interesting and authoritative.

To utilize fully the time available three interesting papers will be presented before the business meeting on Monday afternoon, September 1.

Exhibits

The technical and scientific exhibits should prove of striking interest. The scientific exhibits are the products of research workers who have found in physical therapy a field of medicine offering many opportunities for exploration. Those who have attended Congress sessions of the past few years will well remember the splendid exhibits of decided instructional and educational value. The American Occupational Therapy Association will also have a large exhibit which will be of great interest to everyone.

A large and representative group of technical exhibits should prove worth while to every one attending the convention.

The Congress Dinner

On Wednesday evening, September 3, a combined banquet of the Congress and the American Occupational Therapy Association will be held. On this occasion the gold key awards and medal winners of the scientific exhibits will be announced. The committee has promised several entertaining features with a minimum of speeches. Ladies and other guests are welcome, and it is hoped that the one social function of the convention will be well attended as it always has been in the past.

Headquarters

Official headquarters for the convention and the seminar will be The Mayflower. Arrangements have been made to hold all the meetings in this splendid hotel. The hotel has promised reservations for everyone in spite of the crowded condition in Washington, but everyone contemplating attending the September session is urged to make reservations now to be certain of accommodations. Write directly to The Mayflower, Washington, D. C., for rates and accommodations.

Clinics

Saturday morning following the convention has been set aside for hospital clinics and visits to physical therapy departments. A number of well directed departments should be of interest to every one, including some of the Federal Government. Full details may be had by reference to the program.

Finally it is hoped that every member of the Congress will find it possible to attend the twentieth annual session. Tell your colleagues about this meeting. The central office will be glad to mail preliminary programs to any physician or technician. Washington, the center of interest of today in the United States, extends a hearty welcome to all registrants of the Congress.

PHYSICAL THERAPY IN HOSPITALS AND THE AMERICAN MEDICAL ASSOCIATION

The House of Delegates of the American Medical Association adopted the following resolution at the recent Annual Session in Cleveland:

Resolved, That in order to improve hospital service and the practice of medicine it is recommended that, wherever obtainable, hospitals should have doctors trained in

pathology, radiology, anesthesiology and physical medicine as directors in charge of these respective departments and that the directors of these departments shall be eligible for membership in their respective medical staffs or medical boards with voice and vote.

The clearcut meaning of this important resolution is to encourage the appointment of specially trained physicians in charge of physical therapy and other "laboratory" departments in all hospitals and at the same time counteract any tendency that may exist in some medical boards to discriminate against physicians practicing the "minor" specialties on the ground that because of the essential nature of the service these physicians often have to become salaried full or part time employees and for this reason are thought to be ineligible for a position on the board. It is to be hoped that the resolution will be of definite help in both directions.

There is an instructive background as to the origin and the carrying through of this resolution. It came from a young and very small executive group formed two years ago in the metropolitan area of New York by representatives of the aforementioned specialties, known as the Joint Council of Pathologists, Radiologists, Anesthesiologists and Physical Therapy Physicians. These groups felt that by a united council and by numbers they could carry more weight with organized medicine and hospitals. The joint council was soon able to achieve some administrative and economic adjustments for the groups represented. The resolution adopted at Cleveland was presented on behalf of the delegates of the Medical Society of the State of New York by one member of the council, Dr. Thomas A. McGoldrick, of Brooklyn, and had been carried previously by the Kings County medical society and the New York state society. Among those who spoke for the resolution before the Reference Committee on Medical Education of the American Medical Association were Dr. Roy W. Fouts, of Omaha, vice speaker of the House of Delegates and past president of the American Congress of Physical Therapy; Dr. Charles Gordon Heyd, of New York, past president of the American Medical Association; Dr. Nathan N. Polmer and Dr. Richard Kovács, president and secretary, respectively, of the American Congress of Physical Therapy, and Dr. Madge C. L. McGuinness, secretary of the New York Physical Therapy Society, and of the joint council. Among the arguments in favor of the resolution was the necessity of offering the possibility of professional recognition and advancement, as well as an economic basis, in order to attract desirable men into these specialties.

Physical medicine is slowly but surely taking its place as an essential part of the practice of medicine. However, each step in advancing this aim often takes many months or years of patient, well planned and united effort.

MEDICAL NEWS

Theodore G. Klumpp Appointed Director Division of Foods, Drugs and Physical Therapy of American Medical Association

Following the untimely death of Dr. Paul Nicholas Leech, who had served for many years as Secretary of the Council on Pharmacy and Chemistry, Director of the Chemical Laboratory and Director of Foods, Drugs and Physical Therapy of the American Medical Association, the Board of Trustees gave careful consideration to the problem of securing a successor. The importance of this position in relation to the demands made on its incumbent for judicial decisions, leadership and the assumption of responsibility are so great that but few of the many persons considered seemed to fill the requirements. Now the Board of Trustees announces the appointment to this position of Dr. Theodore G. Klumpp, at present chief of the Drug Division of the Food and Drugs Administration of the United States government.

Dr. Klumpp graduated with the degree of bachelor of science from Princeton University in 1924, magna cum laude; in 1928 he received the degree of doctor of medicine from Harvard Medical School; in 1939 he was made a fellow of the American College of Physicians. Following graduation in medicine he did research and investigative work in the Children's Hospital in Boston for one year. He served as intern in the Peter Bent Brigham Hospital for one year and as assistant resident physician in Lakeside Hospital, Cleveland, from 1930 to 1932. Then he accepted the appointment as instructor in internal medicine at Yale University Medical School, associate physician in the New Haven Hospital, chief of the Hematology Clinic and director of the Medical Laboratories in the New Haven Hospital, holding these positions from 1933 to 1936. At the same time he was associate examiner of the National Board of Medical Examiners and secretary of Yale Medical Society. From 1936 to 1937 he was assistant clinical professor of internal medicine in Yale University. At this time also he accepted the appointment as medical officer of the Food and Drugs Administration in the United States Department of Agriculture, becoming chief medical officer and then chief of the Drug Division in the Food and Drugs Administration, which is now a part of the Federal Security Administration.

In recent years Dr. Klumpp has kept in touch with medical science by serving as adjunct clinical professor of medicine in George Washington University School of Medicine and attending physician in the Gallinger Municipal Hospital of Washington, D. C. He holds membership in many important organizations, including the American Society for Clinical Investigation, the American Association for the Advancement of Science, the American College of Physicians and Sigma Xi. The bibliography of his writings begins in 1928 and includes more than twenty-five contributions on various aspects of research and administration in public health.

Dr. Klumpp assumed his position with the American Medical Association on July 1. — ["Organization Section," J. A. M. A. **116**:2414 (May 24) 1941.]

Dr. Buerki Goes to University of Pennsylvania

Dr. Robin C. Buerki, medical superintendent of the State of Wisconsin General Hospital, Madison, has been appointed dean of the University of Pennsylvania Graduate School of Medicine to succeed George H. Meeker, Ph.D., who will retire October 1. In addition Dr. Buerki will be director of hospitals of the University of Pennsylvania, a newly created post in which he will have direction over the University Hospital, the Graduate Hospital and the Orthopedic Hospital, the university announces. Dr. Buerki, who graduated from the University of Pennsylvania School of Medicine in 1917, is also executive secretary to the dean of the University of Wisconsin Medical School and professor of hospital administration in the school.

Physical Therapy In Army Hospitals

Tables of Organization for Station (Post) and General Hospitals of the U. S. Army allow two physical therapy aides for every two hundred and fifty bed capacity. The Journal of the American Medical Association states that the U. S. Army will have nine general hosptials by the end of 1941. In addition, there are one hundred and thirty-three post hospitals on various military reservations throughout the country.

Of the total of thirteen general hospitals, which will have thirteen thousand, seven hundred and fifty-eight beds, four are established, six were recently completed and three are under construction.

The post hospitals have a total of sixty-five thousand five hundred beds and they are equipped to handle any kind of medical or surgical case. The post hospitals are established, however, with the view of handling short-time patients. The general hospitals receive patients requiring long confinement.

The following general hospitals have been completed recently:

Hospitals	Bed Capacity
Barnes General Hospital, Vancouver Barracks, Washington	750
Lawson General Hospital, Chamblee, near Atlanta, Ga.	2,000

LaGarde General Hospital, New Orleans	1,000
Stark General Hospital, Charleston, S. C.	1,000
Hoff General Hospital, Santa Barbara, Calif.	750
Billings General Hospital, Fort Benjamin Harrison, Ind.	1,000

The hospitals still under construction are as follows:

	Date of Completion	Bed Capacity
O'Reilly General Hospital, Springfield, Mo.	Aug. 24, 1941	1,000
Tilton General Hospital, Fort Dix, N. J.	uncertain	1,000
Lovell General Hospital, Fort Devens, Mass.	uncertain	1,000

The following are the long-established general hospitals of the army in continental United States:

Hospitals	Bed Capacity
Letterman General Hospital, San Francisco	1,204
Fitzsimons General Hospital, Denver	1,458
Army and Navy General Hospital, Hot Springs, Ark.	412
Walter Reed General Hospital, Washington, D. C.	1,184

[J. A. M. A. **116**:2691 (June 14) 1941.]

Dr. John S. Hibben Moves to New Quarters

Friends of Dr. Hibben will be pleased to note his change of address. It is said that modernization plus greater convenience prompted this action. His new address is 201 N. El Molino, Suite 103, Pasadena, California.

Dr. Watkins Appointed Head of Physical Therapy Course

The Bouvé-Boston School of Physical Education, Boston, which gives an approved course for physical therapy technicians announces that Dr. Howard Moore, who has been Medical Director of this course has resigned. Dr. Arthur L. Watkins has been appointed in his place. Dr. Watkins is also director of the Physical and Occupational Therapy Departments at the Massachusetts General Hospital.

New Leads to Prevention of Infantile Paralysis Found

Discoveries that may lead to prevention of infantile paralysis were announced in reports to the medical committee of the National Foundation for Infantile Paralysis.

The mouth and alimentary tract are the probable areas of invasion by the virus of the disease, rather than the nose, as previously believed, and the alimentary tract is the chief site from which the virus is eliminated, Dr. Albert B. Sabin, of the University of Cincinnati, reported.

This puts the disease in a class with ailments like typhoid fever, instead of in a class with colds and influenza, from the standpoint of how it is spread and how its spread may be prevented. Diseases like the common cold which invade the body by way of the nose are spread by germs in nasal discharges, the breath and the saliva. Dr. Sabin could not find the causative virus in nasal secretions or saliva from patients sick with infantile paralysis, nor in portions of the nerves of smell examined after death in 12 fatal human cases. These findings, he pointed out, do not agree with the theory that the virus enters the body through the nose and travels along the nerves of smell to the brain and spinal cord.

Avoiding strenuous exercise and chilling during epidemics was advised by Dr. Sabin and Dr. Sidney O. Levinson, of Chicago, as a possible method of preventing the paralysis even if it does not prevent getting the disease.

"The history of heavy exercise (playing ball, swimming, hiking, etc.) is very frequently given by patients with paralytic poliomyelitis, and a limited personal inquiry has revealed that the interval between this exercise and the onset of paralysis is usually less than 24 hours," Dr. Sabin said. "This short interval suggests not only that those individuals were already harboring the virus in their nervous systems, but also that it might already have involved their medulla ("after-brain") and spinal cord and that the exercise could be the factor which converts what might have remained an inapparent or nonparalytic type of poliomyelitis into the frankly paralytic type of the disease."

This would mean that, at least in epidemic areas, those persons who have fever, headaches, intestinal upsets, pain in the back and neck, and other otherwise unexplained symptoms of acute sickness, should not only see a physician immediately but also, under no circumstances, should indulge in heavy exercise.

Dr. Levinson stated that monkeys with infantile paralysis who were chilled by immersion in cold water developed a more severe paralysis than did either those that remained in their cages or those that were immersed in water at body temperature. This would indicate the obvious necessity of guarding humans with the disease against chilling.—*Science News Letter.*

Find Clues for Predicting Infantile Paralysis Outbreaks

Clues for predicting where infantile paralysis outbreaks are likely to occur in the summer have been discovered by Dr. C. C. Dauer, epidemiologist of the District of Columbia Health Department.

The clues point to a possible outbreak of the dreaded childhood malady in Virginia this coming summer, Dr. Dauer suggests. (*Public Health Reports.*)

The epidemics may not always come off as predicted. The clues which foretell the possibility are found in the number of infantile paralysis cases occurring in a given locality in the late fall and early winter. When there are a relatively large number of cases in a community at such a season, that community and surrounding area is likely to have a severe outbreak the following summer, Dr. Dauer finds from examining epidemic records as far back as the big 1916 infantile paralysis epidemic, when 27,363 cases were reported from 27 states.

Although no preventive of infantile paralysis has yet been discovered, Dr. Dauer suggests that the

possibility of predicting where summer epidemics may come will give scientists a chance to test any preventive measures that may be devised and to carry on valuable preliminary studies on epidemiology and immunology of the disease.

The records show, he says, that "several counties in eastern Kentucky and western West Virginia which had a high incidence in the fall of 1939 appear to have been the focus from which the infection spread to the surrounding area in the summer of 1940. Likewise, the small group of counties in Iowa which reported poliomyelitis in larger number than usual in the fall and winter of 1939-1940, appear to have been the center from which the epidemic in that area may have spread the following summer.

"Several counties in northern Wisconsin reported a number of cases late in the fall of 1939 and a considerable number in January and February of 1940. In the summer of 1940 the disease began to appear first in the area comprising these counties and in the counties of the upper peninsula of Michigan immediately after.

"Such occurrences as described above are not unusual since several similar instances are to be found in the past decade."

As to this coming summer, Dr. Dauer points out: In the state of Virginia poliomyelitis cases were reported in larger numbers than usual, during the months of November and December of 1940. Most of these late cases were reported from counties located in the southwestern part of the State. It will be interesting to see if this instance of occurrence of the disease in this locality in the late fall will be the forerunner of a more widespread outbreak in Virginia and the surrounding area in the summer of 1941." — *Science News Letter.*

Mobile Unit for Physical Therapy

Lord Horder, president of the Chartered Society of Massage and Medical Gymnastics, presented, on behalf of subscribers, a physical therapy mobile unit, which is complete with its driver and a skilled masseur, for use in Red Cross work. It makes its own electricity for electrical treatment and will be used for visiting convalescent homes and hospitals in central England. The unit contains all the necessary apparatus for giving electrical and light treatments, such as galvanism, infra-red rays, radiant heat, ultraviolet radiation and paraffin-wax baths. The unit is the first of its kind and is to be followed by others. — ["Foreign Letters," J. A. M. A. **116**:2330 (May 17) 1941.]

Extract Antigens From Germs With Intense Sound Waves

Squeezing and shaking substances valuable in medicine out of cultures of disease germs by means of intense sound waves is the biological feat that has been accomplished by two University of Pennsylvania scientists, Dr. Leslie A. Chambers and Dr. Earl W. Flosdorf.

The substances they obtain belong to the class known as antigens. They are poisons secreted within the germs' bodies. Injected into the human body in suitably small quantities, they may be used in provoking the formation, by our own tissues, of opposing substances known as antibodies, which defeat the germs if they attack later on. Or the antigens may be injected into the bodies of animals, from which blood is later withdrawn for making immune serums for medical use.

Present methods of obtaining antigens involve heating, addition of chemicals, or other treatments that injure or destroy certain of the more sensitively composed antigens. This is what the new method of Drs. Chambers and Flosdorf is designed to avoid. Its treatment of the germs is strictly physical or mechanical, and it can be conducted at a low temperature.

The foundation of their apparatus is a magnetized metal tube, usually made of nickel, which is caused to vibrate extremely rapidly by flowing an alternating electrical current around it in coils. The sound waves thus set up may be either exceedingly shrill, or even so highpitched as to be in the ultrasonic range, beyond reach of the human ear. In either case, they are made highly intense.

Over the upper end of the metal tube a glass tube is fitted, with a leak-tight rubber joint. Into the chamber thus formed a culture fluid containing billions of germs is poured. Then the current is turned on and the vibrations started. After the treatment has been continued long enough to get out most of the antigens (and incidentally, to shatter most of the germs), the process is stopped, and the liquid is first centrifuged and then passed through a fine porcelain filter, to remove all debris and any of the germs that may have survived the treatment.

The antigens are in the clear, germ-free liquid that has passed through the filters. Some types of these antigens are so sensitive and unstable that they will spoil if kept for only a couple of hours at temperatures a little above freezing. However, if the liquid is frozen at once and the water evaporated out of the ice, the solid, dried residue, now consisting of concentrated antigens, can be kept for a year or more, the experimenters state.

Drs. Chambers and Flosdorf have obtained U. S. patent (No. 2,230,997) on their apparatus and process, on which they have assigned their rights to the University of Pennsylvania. — *Science News Letter.*

"Blueprint in Sky"

With what he called a "blueprint in the sky," Prof. Anton J. Carlson of the University of Chicago outlined his scientist's ideal of a democratic society.

"To my way of thinking," he said, "a truly democratic society is that social, economic, and political order which favors or permits the maximum freedom and opportunity for the efforts and achievements of the individual, consistent with the common welfare, and gives the individual full or equal share and responsibility in establishing, balancing and sustaining that freedom and opportunity. Again, to my way of thinking, this does not mean equal responsibility from each citizen, for we are not born with equal capacities, mental,

moral or physical. If there was now, or ever could be devised, a way to assess individual social responsibility strictly according to individual capacity, I think we would be on the road to a closer approximation to social and economic justice for all than is the case in any extant democratic society or democratic way of life of which I have ken."

Nowhere, Prof. Carlson hastened to add, is there an actual, factual realization of this blueprint. No democracy is all white—they are all gray. No totalitarian state is all black—they are all a darker shade of gray. However, the leaven of democracy is at work everywhere. Even in Japan, where the Emperor is not merely the supreme ruler but God himself, democracy is astir among the masses.

Failure to realize democracy, despite the many trials that have been made, Prof. Carlson laid to "the eternal cussedness, the dishonesty, the greed, the vanity, and the laziness of man. But although this goal seems as far away as the proverbial rainbow, I would rather chase this rainbow than stay contented in the jungle." — *Science News Letter.*

The National Foundation for Infantile Paralysis

The National Foundation is trying constantly to give every possible aid to infantile paralysis patients through the combined efforts of its Chapters and the parent organization.

Within the scope of its national activities the Foundation is carrying on an extensive educational campaign as to the proper care and treatment of poliomyelitis patients and whenever an outbreak of epidemic proportions occurs it stands ready to render every assistance that it can command.

One of the many responsibilities that the Foundation has assumed as an invaluable aid to infantile paralysis patients in the acute stages is the free distribution of Toronto splints and Bradford frames in epidemic areas and to indigent persons, regardless of age, who may need them. Over 3,000 of these appliances have been used during the past two years and their central supply depot in New York City is ready to meet any future deserving requests for these splints and frames.

There is no charge for these splints and frames except expressage and they can be obtained upon the request of any County Chapter officer or responsible person in the medical profession.

Armor for British Tommy Advised by Surgeon

If the European war gets past the Blitzkrieg stage to anything like trench warfare, British soldiers may be wearing armor plates in the respirator boxes of their gas masks. According to word just received at the American Medical Association, Kenneth Walker, English surgeon with experience in treatment of wounds in front line conditions during the last war, now recommends the use of such armor.

His recommendation seems likely to be followed in view of the fact that such an armor device which he suggested near the close of the last great war won the approval of Winston Churchill, then Minister of Munitions and now Prime Minister, to the extent that Mr. Walker was recalled to work at the ministry as expert in light armor.

A soldier cannot, because of the weight, wear armor that would protect him against bullets, but nearly two-thirds of the wounded in the World War were put out of action by projectiles other than bullets, Mr. Walker recalls now in a report to the *British Medical Journal.* Over one-third of those found dead on the battlefield had chest wounds. Mr. Walker noted that a large number of men died in the trenches as a result of being hit in the front of the chest by tiny fragments of grenade or shell that tore open a large blood vessel, death following as a result of hemorrhage.

A steel plate, curved to fit the chest, would, Mr. Walker believed, protect the most fatal area if worn in the box respirator when the latter is carried in the alert position. His suggestion for such a device during the World War was pigeonholed for a time until a friend brought it to the attention of Churchill. Mr. Walker declined the position as light armor expert then offered him, because it had taken two years to get the steel helmet introduced and the war was nearly over.

Now, however, he believes that since the principle of protecting the head from projectiles of low penetrating power has been accepted, it is time to extend the principle to other vulnerable areas. — *Science News Letter.*

Dr. Gardiner A. Huntoon 1874-1941

It is with regret we announce the passing of Dr. Gardiner A. Huntoon of Des Moines, Iowa, on May 30 last. Dr. Huntoon has been a member of the Congress for nearly thirteen years. Dr. Huntoon was born in 1874 and received his doctorate degree from the State University of Iowa College of Homeopathic Medicine, Iowa City, in 1896. In addition to being a member of the Congress he was a member of the Board of Health of Iowa from 1911 to 1913, and on the staff of the Iowa Lutheran Hospital. The ARCHIVES and the Congress extend his family heartfelt condolence.

BOOK REVIEWS

INFANTILE PARALYSIS. ANTERIOR POLIOMYELITIS. By *Philip Lewin*, M.D., F.A.C.S. Associate Professor of Bone and Joint Surgery, Northwestern University Medical School; Professor of Orthopedic Surgery, Cook County Graduate School of Medicine; Attending Orthopedic Surgeon, Cook County and Michael Reese Hospitals; Consulting Orthopedic Surgeon, Municipal Contagious Disease Hospital, Chicago. Illustrated by *Harold Laufman*, M.D. Cloth. Pp. 372 with 165 illustrations. Price, $6.00. Philadelphia and London: W. B. Saunders Company, 1941.

Anterior poliomyelitis and its crippling sequelae have been in the center of interest of the medical profession as well as of the laity for a number of years, but the reports on the progress made and on the still unsolved problems have been often confusing. The author, a distinguished orthopedic surgeon who has devoted special attention for many years to infantile paralysis, has performed valuable service by presenting the subject as a whole for the guidance of the family physician. It is the family physician who sees the patient first and who should act as a well informed guide through all phases of the dreaded disease. Dr. Lewin has fulfilled his purpose by a presentation, clear and up-to-date. He has combined his matured opinion and that of other authorities to form a broad and liberal viewpoint. The subject matter has been illustrated in an admirable manner by the use of excellent drawings by an able physician, and by many photographs and comprehensive tables. The introductory chapters are concerned with the background, etiology, epidemiology, predisposing factors and pathologic changes of the disease. Full attention is then given to symptomatology, the early diagnostic features and the routine examination. These chapters are especially well illustrated. After a chapter on prognosis and mortality the bulk of the volume is devoted exclusively to treatment. The immediate medical and orthopedic care, physical therapy after the acute stage and during the convalescent and chronic stages, the use of braces and finally the operative management of the residual effects of poliomyelitis are fully discussed. It is characteristic of the broad experience of the author that in impressive contrast to some of the orthopedic authorities who blandly put down the dictum "no electricity in any stage of infantile paralysis," he gives a balanced presentation of the rationale and technic of all effective physical methods of treatment; these are immobilization, muscle training, underwater exercises, massage after the acute stage and thermotherapy, electrotherapy, heliotherapy and orthopedic nursing in the home during the convalescent and chronic stages. An appendix deals with the social and educational aspects. There is also a stimulating popular summary of the "postulates of polio" enlarged from the popular writings of the author. Dr. Lewin's volume fills a long felt need by supplying a comprehensive, practical and authoritative contribution toward the better understanding and more effective combating of infantile paralysis. It should be welcome not only as a dependable guide for general practitioners, but also as an easily readable ready reference for medical men, technical and nursing personnel and social workers confronted with the problem of infantile paralysis.

DIAGNOSIS AND TREATMENT OF ARTHRITIC AND ALLIED DISORDERS. By *H. M. Margolis*, M.D., F.A.C.P. Chief, Arthritis Service, St. Margaret Hospital; Associate in Medicine, Montefiore Hospital, Pittsburgh. Cloth. Pp. 551, with 140 illustrations. Price, $7.50. New York: Paul B. Hoeber, Inc., 1941.

The book is intended primarily for the general practitioner to help him diagnose and care for his rheumatic patients. The material is presented clearly and concisely. The many controversial factors frequently considered in discussions of the arthritic disorders are omitted. Approximately one fifth of the book discusses pain low in the back and sciatic pain. Although these disorders must be considered with the arthritic diseases, it might have been better to keep this material for a separate monograph. As presented the material is sketchy and because of the author's attempt to be inclusive, many of the chapters would tend to be confusing to the family physician. The chapter devoted to physical therapy covers only fourteen pages with four of these devoted to roentgen therapy. The brief mention of several types of physical therapeutic agents which have been found beneficial and the cursory discussion of the physical triad used in the treatment of arthritis, namely heat, massage and exercise, would fail to impress the reader with their importance. It is regretted that the author refrains from specific details concerning the use of physical measures when he is exact in giving the technic and dosage for roentgen therapy. There are a few statements which should not meet with general approval, such as focal infection for atrophic arthritis is "definitely accepted by most clinicians," "there is accumulating evidence that vitamin deficiency, especially Vitamin C may be in some measure responsible for the occurrence of rheumatic fever," "the heated cabinet (hypertherm) is the most satisfactory means of giving fever therapy for gonorrheal arthritis," "conditions in the pelvis constitute, however, insignificant factors in low back pain." Failure to evaluate sulfapyridine and the other sulfanilamide compounds in the treatment of gonorrheal arthritis should not be expected in a volume dated 1941. The illustrations are ample and instructive, and the bibliography is extensive and up-to-date. One of the best chapters is headed "Management and Prevention of Arthritic Deformi-

ties." This chapter is complete and well illustrated, and the outline form followed should be welcome. The volume can be recommended as definitely worth while for the busy practitioner who wishes to be informed of the more recent and practical concepts of the arthritic disorders.

SCIENCE IN PROGRESS. By *L. J. Stadler; F. W. Went; J. F. Fulton; Douglas Johnson; Alfred C. Kane; H. P. Robertson; Carl D. Anderson; Duncan A. MacInnes; J. W. Brams; J. C. Hunsaker.* Edited by *George A. Baitsell.* Second series. Cloth. Pp. 317 with 129 illustrations. Price, $4.00. New Haven, Conn.: Yale University Press, 1941.

This volume is made up of ten notable contributions to scientific knowledge and is based upon the National Sigma Xi Lectures delivered in various parts of our country during 1939 and 1940. It is the second in the series and recalls with what wide acclaim its predecessor was greeted, even to the extent of becoming both an outstanding science book of the year and a selection of the Scientific Book of the Month Club. The publication of these lectures therefore promises to become a permanent institution, because their popularity is making its distribution an assured financial success. To the question, what is the underlying purpose and inherent value of *Science in Progress?* one can best answer by summarizing the thoughts so cogently expressed by Dr. Harlow Shapley in the Foreword of the first volume. It is his conviction that the educated man of today in contrast to the encyclopedist of a century ago, finds himself so deeply immersed in a world of multitudinous facts that, gifted as he may be, he cannot comprehend and grasp all the theories, experimental data and emerging hypotheses without the aid of outside collaboration. To achieve a full and rounded view of the world we live in, one must seek those contributions provided by scientists that offer a welded or synthetized effort for our intellectual digestion. Such a unity of science and knowledge is the common ground upon which these lectures are based. They give the reader an opportunity to envision the brilliant progresss in the diverse fields of science and appreciate the trends of a constantly enfolding world. It is more than stimulating to read for instance, how heredity is today altered by biologists and its influence on the human and other types of chromosomes; how plants can be regulated in growth and its implication in the human problem; how the frontal lobe influences a regulatory action on the entire body beyond that attributed to any other single source; how to determine the age of the earth; to recognize and understand this expanding universe of ours, and the like. The titles are arresting, the authors, authoritative, and the exposition as practical as it is brilliant. It is trite to say that these ten lectures are provocative and perhaps it would be the better expression to say that each is chock-full with facts so rich and timely that they will in part satisfy the intellectual curiosity and reveal the temper and progress of the sciences as they influence the future of mankind.

TEMPERATURE. Its Measurement and Control in Science and Industry. Papers Presented at a Symposium Held in New York City, November, 1939, under the Auspices of the American Institute of Physics with the Cooperation of National Bureau of Standards and National Research Council. Cloth. Pp. 1362. Price, $11.00. New York: Reinhold Publishing Co., 1941.

The American Institute of Physics planned this symposium for the following purposes: (1) coordination of the treatment of the subject of temperature in the several branches of science and engineering, (2) review of fundamental principles and a recapitulation of recent progress, (3) accumulation of contributions for the publication of a comprehensive text, (4) emphasis on the importance of temperature as a branch of physics, and (5) improvement of technical curricula through making the latest information available. The volume is proof that these purposes were fulfilled at the symposium. The symposium papers with the discussions have been arranged in thirteen chapters. In the chapter on temperature regulation in man there are the following papers of interest to physicians doing research in physical therapy: Bazett, on temperature sense in man; Jenkins, on a new basis for cutaneous temperature sensitivity; Winslow, on man's heat exchanges with his thermal environment; Burton, on the operating characteristics of the human thermoregulatory mechanism; Hardy, Milhorat, and Du Bois, on heat loss and heat production in women under basal conditions at temperatures from 23 to 35 C.; Hardy and Du Bois, on the significance of the average temperature of the skin; Gagge, on standard operative temperature, a single measure of the combined effect of radiant temperature, of ambient air temperature and of air movement on the human body; Bierman, on temperature changes in the muscles of the human leg; Sheard, Williams and Horton, on skin temperature of the extremities under various environmental and physiological conditions; Sheard, Roth and Horton, on normal vasoconstriction, vasospasm and environmental temperature; and Smith and Fay, on observations on human beings with cancer maintained at reduced temperatures of 75 to 90 F. This volume can be highly recommended as a comprehensive reference work on temperature.

THE 1940 YEAR BOOK OF OBSTETRICS AND GYNECOLOGY. Obstetrics. Edited by *Joseph B. DeLee,* A.M., M.D., Professor of Obstetrics, University of Chicago Medical School, etc. Gynecology. Edited by *J. B. Greenhill,* M.D., F.A.C.S., Professor of Obstetrics and Gynecology, Loyola University Medical School, Chicago. Cloth. Pp. 692 with 145 illustrations. Price, $2.50. Chicago: The Year Book Publishers, Inc., 1941.

This book celebrates the fortieth anniversary of the Year Book series and because of this each of the editors has included instructive articles of special interest. Dr. De Lee writes on "Fifty Years of Eclampsia, Placenta Previa and Cesarean Section." This important contribution should be read by all interested in maternal welfare. Roentgen methods

for bony pelvic study, improved biologic technics for diagnosis of pregnancy, and a study of the ovary of Lina Medina of Peru who became pregnant at five and one-half years of age and was delivered eight and one-half months later by cesarean section, are only some of many informative contributions of this Year Book. Lengthy abstracts of therapy in toxemias and other frequent complications of pregnancy are included that would be of practical value to the busy practitioner. In the chapter concerning the new born many interesting articles are abstracted on the problems of asphyxia and new apparatus for its treatment. Vitamin K for the treatment of hemorrhage during the early phase of the neo-natal period of the baby are some of the interesting features of the section on obstetrics. The gynecologic literature of 1940 is edited by Dr. Greenhill. This section is introduced by a special article on "Progress in Gynecology Since 1900." This interesting article brings many of the hitherto vexing problems of female pelvic disease into the clear light of present day interpretation. The publishers as in the past reproduced for the editors many interesting step by step illustrations of newer gynecologic operations. Sterility, pelvic infections and endocrine aspects of female disorders are ably reviewed since they have a timeliness of views expressed in the past year. The instructive comments of the editors frequently appended to many of the articles are in themselves highly informative.

TREATMENT BY MANIPULATION. By *H. Jackson Burrows*, M.D., F.R.C.S., Assistant Orthopedic Surgeon, St. Bartholomew's Hospital, etc., and *W. D. Coltart*, M.B., F.R.C.S., Chief Assistant, Orthopedic Department, St. Bartholomew's Hospital, etc. Cloth. Pp. 36 with 30 illustrations. Price, 5/net. London: "The Practitioner," *in conjunction with* Eyre & Spottiswoode, 1940.

This small volume initiates a series of monographs on topics of practical interest to the profession. Dealing as this one does with the problem of manipulation, it unfortunately provides only a brief exposition of the growing interest in a field pioneered and neglected by medicine, abused and exploited by borderline schools, and now conservatively utilized in medical practice. Although the booklet lacks the framework of historic background, it points out that the medical profession has dwelt too long on the disasters of the "bone-setter" and too little on his successes. Side by side with this it is obvious that we are in the midst of a situation where the public at large is not only resorting to the unqualified but has found it rather a fashionable and bizarre adventure. Successes have been magnified into entertaining social conversations; failures silenced, because few appreciate the humor of being the butt of their own ignorance. In contrast the public has paid the medical profession a distinction or compliment of accepting in silence and as a matter of course their successes and discussing their unsuccesses as things of interest and worthy of comment. It is within such a background that the medical profession has in recent years gradually attempted to review the value of what Paget called the "cases that bone-setters cure"—chronic strain and certain other related conditions, and to evaluate the methods and skill of manipulation under orthodox control. The present volume is therefore of practical import because it has attempted to present the elementary facts pertaining to this practice. In the space of two sections the authors (orthopedic surgeons) define and discuss the nature and conditions, dangers and failures of manipulation. Approximately, one-third of the space is devoted to general considerations—terminology, diagnosis of certain affections, the selection of cases and technic. The second part attempts to apply principles to special or individual symptoms—feet, ankles, knees, hips, spine, shoulders, elbows and the like. The value of this booklet must be judged not so much by the brevity of its contents but rather by its provocative message on a subject which the medical profession seeks more reliable information.

X-RAY THERAPY OF CHRONIC ARTHRITIS. By *Karl Goldhamer*, M.D., Associate Roentgenologist, St. Mary's Hospital and Quincy X-Ray and Radium Laboratories. Cloth. Pp. 131 with 26 illustrations. Price, $2.00. Quincy, Illinois: Radiologic Review Publishing Company, 1941.

A complete and authoritative volume on the subject of the use of roentgen rays for the care of the arthritic patient is sorely needed but one doubts whether this monograph can be recommended without some misgivings. The author in this preliminary report is too enthusiastic in the use of this therapy to the exclusion of other types of treatment. His clinical conception of the various arthritic diseases seems somewhat vague so that it is necessary to be critical in accepting his results. It is certain that the number of cases is too small and the length of observation (twenty-one months) too short to judge properly the effect of the use of roentgen rays. More controlled work must be done than is presented before his method can fully be evaluated. The impression created by the author that by the use of his method, here at last is a simple and successful means of curing all arthritics, seems too good to be true. The statement, "hypertrophic arthritis receives better results from irradiation than the atrophic type," is unfortunate because it is for the atrophic type that successful treatment is so urgently needed since the relatively simple physical therapy measures have been found to be efficacious for the hypertrophic type. The chapter on the review of the roentgenographic observations of both atrophic and hypertrophic joints of the body is well organized and clearly presented and would be helpful to the general practitioner who occasionally takes a film of an arthritic joint. The use of drawings rather than original roentgen pictures seems to be a wise choice.

VITAMINS. WHAT THEY ARE AND HOW THEY CAN BENEFIT YOU. By *Henry Borsook*, Ph.D., M.D., Professor of Biochemistry, California Institute of Technology. Cloth. Pp. 212. Price, $2.00. New York: The Viking Press, 1941.

Professor Borsook has rendered Medicine an estimable service by reducing his formidable and important subject to an informal exposition, spiced with wit, humor and compassionate understanding. No writer on this topic has so ably conveyed his message of the significance of vitamins in nutrition and their import to dietotherapy than has the author. He has, as it were, taken the "myst" out of the mystery of food values by presenting the facts so lucidly and logically that its reading becomes as fascinating an occupation as that of the most challenging fiction. Indeed, it outdoes the romance of fiction, because here, truly, the old adage of truth being stranger than fiction has its verification in more than one sense. It disposes once and for all the claims of past and present faddists and establishes a scientific basis for nutritional value in foods to a degree of making sense out of nonsense. Though our knowledge of vitamins is comparatively recent, perhaps no more than a generation, this new information has already stripped the bombast from the charlatans who like the character in Molier's imperishable comedies have been wont to treat all "chronical disease" with "detersive clysters and leafy spices." No one appears more aware of the foibles in food and no one seemingly enjoys to prick these bubbles even when they are at the expense of his own fraternity, the medical profession. The work defines and explains the nature and purpose of vitamins in health and their significance as a deficiency problem in the field of nutrition. The book explains among a host of other important items, why a lack of vitamin A renders one unfit to drive a car and how it reduces visual acuity; why the Japanese born in California are taller than those born in Japan (growth); what, for instance, vitamins B and C did for the men in the Everest expedition; why peanut butter is called the "Cinderella among foods"; where to buy vitamin D milk; what sunshine has to do with vitamin D; why vitamin E is important to expectant mothers; what vitamins can do to control the most painful of diseases; and how to balance a diet in order to obtain the best energy and vitality for either building or reducing purposes. To read this small volume is to obtain an authoritative education of how to utilize vitamins for more abundant health. Borsook implies that vitamin B, composed of at least six components, is the Admirable Crichton of all of the vitamins. In its intelligent use there lies the promise that it will serve so many valuable purposes that their enumeration would read like the flaming promises of the nostrum venders. No less picturesque and interesting reading is his evaluation of vitamins E, F and K — Birth, Beauty and Death. One has but to read this brilliant exposition by one of America's outstanding scholars to realize that the tomorrow of medicine will be the richer for the inclusion of scientific dietotherapy. This is a "must" book for all physical therapeutists.

SOCIETY OF PHYSICAL THERAPY PHYSICIANS

The Society of Physical Therapy Physicians will hold its annual meeting at The Mayflower. Members of this Society are urged to consult the hotel bulletin board for announcement of time and meeting place.

PHYSICAL THERAPY ABSTRACTS

Low Back Pain and Trauma. Harry E. Mock.
Am. J. Surg. **51**:779 (March) 1941.

The author's treatment of compression fractures gradually evolved in the last ten years, since he gave up the use of prolonged immobilization and especially the use of back braces, is based on anatomic and physiologic facts, viz.:

1. Multiple joints exist about each vertebra.

2. The capsule and adjacent ligaments about these joints, as well as the more distant ligaments of the spine, may be stiffened by prolonged immobilization.

3. Soft tissue changes, the result of atrophy and disuse, may occur in the muscles and aponeuroses.

4. Hyperextension, with resulting muscular and ligamentous pull on the body of the vertebra, is needed to overcome the compression. By increasing this hyperextension daily and within the patient's tolerance, the reduction of the fracture can be obtained within a period of two weeks just as well and with far less danger than by forceful hyperextension under anesthesia.

5. The allowing of hyperextension exercise causes early mobilization of the joints, and as soon as the hyperextension cast is applied, the patient is permitted to walk, usually at the end of three weeks.

6. Muscle tone and strength and pliable aponeuroses are maintained by the daily use of heat and massage. This procedure is facilitated by turning the patient onto his belly while he is in the hyperextension position, and later, after the hyperextension cast is applied, cutting a large circle in the back of the cast for the purpose of continuing the application of heat and massage.

7. The fractured vertebra is healed at the end of eight to ten weeks, depending on the physical condition of the patient, and at this time the cast is removed. If physical therapy has been properly performed daily, the patient will not feel the need for a back brace or other support. No patient of the author's with a compression fracture has had a back brace within the last ten years.

Physical therapy unless used intelligently may be far more responsible for continued pain low in the back than is the original disease or injury. Given a trivial injury in a nervous patient who shows a tendency to exaggerate his condition, one can often rub in more disabling conditions in a week than he can rub out in a year. The use of diathermy, irradiation, heat-producing exercising and vibrating apparatus often serves more to impress the patient with the seriousness of the situation than to cure him. Common sense and intelligent hand work are the essential factors in physical therapy to the spine. Machine therapy is rarely indicated. The overly enthusiastic, talkative physical therapy technician, suggesting a curvature of the spine here, a spasm in the muscles there, or the presence of painful nodes, is a menace in any case of injury to the back.

The Treatment of Peripheral Vascular Disease. William Bierman.
Physiotherap. Rev. **21**:35 (Jan.-Feb.) 1941.

The skin of the feet should be cleaned carefully, dried and kept soft with olive oil; the climate in which an individual lives should be chosen carefully, and those who suffer from peripheral vascular disease should not smoke.

In addition to the systemic treatments for example, the administration of insulin and the institution of a dietetic regimen for diabetes, emphasis is placed on local treatment, that is, surgical, chemical and physical.

The number of physical technics for the treatment of peripheral vascular disease has increased during the past few years. There was a lack of appreciation of the fact that it is necessary to be careful about the application of heat. Too much heat can be harmful. It has been shown by Landis that in a comfortable environmental temperature the pressure in the arterial side of the capillary loop amounts to about the equivalent of 32 mm. of mercury, while on the venous side of the loop the pressure is about 12 mm. In the intercellular spaces the value is about 26 mm. When the temperature of the finger is raised to 107 F. these pressure changes become markedly altered. Thus the pressure in the arterial side of the capillary loop may rise to 60 mm., that of the venous to 45 mm., while the intercellular pressure remains at about 26 mm.

An excellent method for the application of heat is the use of a thermostatically controlled leg cradle, the temperature of which is maintained at about 93 F. This is probably the most important physical measure which can be utilized in the treatment of peripheral vascular disease.

As in many other conditions, rest is an important consideration. Its pain-relieving value is discovered by the patient himself, who has pain on walking.

Following the introduction a few years ago of intermittent positive and negative pressures applied to the lower extremity by means of a leg boot, large claims were made for its use. The clinical experience of many physicians tends to show that this apparatus is of limited value.

Care of the Feet of Normal Children. Harold A. Sofield.

Illinois M. J. **79**:253 (March) 1941.

How can the normal foot be preserved and its development as a first class useful structure be encouraged? More and more physicians are being consulted by mothers who do not believe there is anything wrong with their children's feet but who are wholly confused by the contradictory advice promulgated by magazine articles and competing shoe salesmen.

When should real shoes be put on? Climate permitting, real shoes should be worn only when the neighbors become too persistent about the mistreatment of the child. We are living in a social environment and must subscribe to the minimum of its dictates. So shoes must be worn. These should be as soft and flexible as possible, oxfords preferred, and as much play of muscles as possible should be permitted. The least heel available the better. The idea that girls need more height of the heel than boys is another superstition with no foundation whatever. Not so many years ago, the reverse was believed to be true and boys' heels were higher than girls'. Keep the heels as close to the earth as possible. Shoes should be cut full, and plenty of toe room should be available. If the edge of the oxford gaps across the instep or under the lateral malleolus, it is of little consequence. The size of shoes should be changed frequently as the child grows.

Under no circumstances should shoes be fitted with an effort made to keep the foot from spreading. The normal foot should grow to its normal size and shape and no effort of molding be made. As soon as the architecture of the normal foot is tampered with by attempting to limit its growth in any direction, trouble is being courted.

Newer Trends in Hospital Plans and Equipment. Edward F. Stevens.

Hospitals **14**:83 (Oct.) 1940.

Some of the new hospitals of 100 beds or over are being provided with a department of physical therapy, and with many portable treatment machines the space required should be commensurate with the needs. Hydraulic fixtures, of course, must have water and drain. Hydrotherapeutic facilities for patients with poliomyelitis must of necessity occupy more space, sometimes up to the 25 or 50 feet for special baths with which nurses and attendants could treat the patients in the water. A modern example is the recently completed out-patients clinic of the Hospital for Joint Diseases in New York.

Cardiovascular and Systemic Morbidity Following Hyperpyrexia in Central Nervous System Syphilis. Alan A. Lieberman, and Charles J. Katz.

Illinois M. J. **79**:132 (Feb.) 1941.

General systemic and cardiovascular changes were studied in 173 cases of syphilis treated with hyperpyrexia. The authors conclude that malaria is a very rigorous and debilitating form of treatment and is suitable only for patients in good physical and neurologic condition who show no fluoroscopic evidence of aortic involvement.

Typhoid vaccine treatment is less drastic, attended by lesser morbidity, is more easily controlled and can be safely administered to patients with aortic involvement. The triple dose technic of typhoid administration is offered to increase the number of fever hours without the attendant drastic effects of malaria. Emphasis is made on careful cardiovascular and general systemic evaluation with special emphasis on fluoroscopic diagnosis and careful electrocardiographic and blood pressure studies during the course of treatment.

Treatment of Dementia Paralytica. Jack R. Ewalt and Franklin G. Ebaugh.

J. A. M. A. **116**:2472 (May 31) 1941.

These authors state that in a five year study of 232 patients with dementia paralytica have been treated with either therapeutic malaria or artificial fever therapy. All patients treated by both methods were subjected to detailed clinical and laboratory studies before treatment was instituted. The patients in the malaria series in most instances received fifty hours of fever at 104 F. or more. In the first three years of study patients in the artificial fever series received fifty hours of fever at rectal temperatures of 105 F. to 106 F., given as ten treatments of five hours each. During the last two years of the study the artificial fever group received only thirty-six hours of fever but at a rectal temperature of 105.8 F. given as twelve treatments of three hours each. Remission or improvement was noted in 69 per cent of the artificial fever group as compared with 58 per cent in the therapeutic malaria group. The follow-up therapy in the two groups has been as nearly identical as the vagaries of clinical practice will allow. The method of therapy with artificial fever has been safer and has been productive of better results. The importance of follow-up care is emphasized. Improvement in the care of patients during malaria therapy and more attention to follow-up medication has improved the results of malaria therapy in our clinic, although these results still remain inferior to the results obtained with artificial fever therapy.

Patients with physical contraindications to therapeutic malaria may, in many instances, be safely treated with artificial fever therapy. Either method is reasonably efficient if properly managed and if general follow-up treatment and care are adequate.

The serologic responses roughly parallel the clinical results in the two series. Careful, periodic, clinical reexamination offers the best guide for therapy and gives the most reliable data for evaluation of results.

Diseases of the Respiratory Tract and Air Conditioning. Carey P. McCord.

J. A. M. A. **116**:1360 (March 29) 1941.

At this time there exists interest in the possibilities of lessening respiratory diseases through the killing off of atmospheric bacteria through several agencies, chiefly ultraviolet radiation. It is now proved that bacteria may remain in the atmosphere over long periods. Ultraviolet radiation may destroy these bacteria or reduce the number present in the atmosphere. However, there is no proof that any respiratory disease in human beings ever has been produced by bacteria or virus suspended in the atmosphere under such circumstances as to be subject to destruction by ultraviolet radiation. Possibly this statement does not apply to animals in the laboratory. Lately, much publicity has been given to proposals to install such appliances in army barracks, mess halls and recreation rooms. More investigative work is necessary before any conclusion may be reached in support of ultraviolet radiation to reduce the frequency of respiratory diseases. Wells states that they are beginning to gather experience on the spread of contagion through aggregations sharing common atmospheres. And while entertaining convictions, they are not prepared to publish conclusions on the basis of present results.

The Value of High Frequency Currents in Cancer Surgery. Tibor de Cholnoky.

Med. Record **153**:187 (March 19) 1941.

Evolution of the use of high frequency current is outlined from the point of view of cancer surgery with critical discussion of current statements. Indications based on personal experience are briefly discussed. Results are given covering the ten year period of its use. It was found that of 105 cases of advanced carcinoma, in many of which irradiation was tried and failed or the lesions recurred after radical operations, five year arrests were obtained in 8.5 per cent, with a postoperative mortality of 8.3 per cent, high frequency electrothermic methods being used.

Occupational Therapy Pays Its Way. A. C. Seawell.

Mod. Hosp. **56**:69 (Jan.) 1941.

The equipment necessary will depend not so much upon the size of the general hospital as upon the emphasis that is to be placed on occupational therapy. The initial investment can be as low as $100 or $200 or can range up to $1000 or more. Occupational therapy needs to be better publicized to the medical profession, as well as to the hospitals. It is surely not unethical for information to be distributed where it is needed.

The cost of maintenance must also be considered. This includes the salary for the therapist and the allowance for supplies used in the treatment. According to the Philadelphia School of Occupational Therapy, salaries range from $65 to $100 per month with maintenance, or from $100 to $145 without maintenance. Where the occupational therapy department is large and several assistants are employed, the chief therapist usually receives a proportionately larger sum, sometimes as high as $2400 annually.

What income can be expected from an occupational therapy department? First, there is the income from the charges for treatments to private patients. This ranges from $1.50 to $2.50 per treatment although that figure can be reduced on the recommendation of the doctor or the social worker. Funds for the support of the department can also be derived from sale of articles made by the patients.

Insurance companies as a source of income have never been fully utilized. Any insurance company executive will be interested in how to reduce the company's losses. The doctors could do much toward educating the insurance companies on the value of occupational therapy by showing how this treatment helps to restore the use of injured parts, with earlier discharge and reduction in insurance settlements.

The Organization of an Arthritis Clinic. With Special Reference to the Arthritis Clinic at the Hospital for the Ruptured and Crippled, New York City. R. Garfield Snyder, and Cornelius Traeger.

New York State J. Med. **41**:365.

An arthritis clinic located in a class A general hospital has many obvious advantages. The general hospital has a large staff of specialists and internists, which makes possible a thorough study of each case. Unfortunately, not all well-trained internists are interested in the problems of arthritis.

An arthritis clinic located in an orthopedic hospital has certain advantages over the arthritis clinics located in either university or general hospitals, because every arthritis patient is potentially or actually an orthopedic problem, and, therefore, requires the closely coordinated efforts of both the internist and the orthopedic surgeon. It is our opinion that the ideal location for an arthritic clinic is in an orthopedic hospital, because of its well-equipped laboratory, x-ray, and physical therapy departments, the latter department being an essential component of any good arthritis clinic.

In this hospital, the following facilities are at the disposal of the arthritis clinic for consultation, diagnosis, or treatment: (1) laboratory service — (a) biochemical, (b) serologic, (c) bacteriologic, (d) pathologic; (2) roentgenologic facilities; (3) physical therapy department; (4) special consultants-genito urinary, otolaryngologic, gynecologic, dental, etc.; (5) photographs, including moving pictures of each new patient — 50 to 100 feet in all positions and walking; and (6) occupational therapy.

Galvanic Cautery Transurethral Resection. A Report of 290 Cases. Evan Kackley.

J. Urol. **45**:451 (March) 1941.

Thompson warns against the over-use of the coagulating current in the multiple needle electrode as in his experience delayed hemorrhage (10 to 14 days) in 7 per cent and late hemorrhage (three months to two years) in 5 per cent, a total of 12 per cent of secondary bleeding in 273 subjects. When this report first appeared, the writer was prone not to accept a delayed hemorrhage of two years as being related to the operation, but rather a manifestation of the progression of benign or malignant obstruction; however, since then he has had the opportunity to witness the resection of three high frequency burns of the body from large air spaced electrodes used in the treatment of various myalgias. These burns penetrated deeply through the muscle to the bone. Beneath the friable scar tissue, which showed no tendency to epithelialize in subjects varying from one to three years, there was a zone of fibrinous gelatinous degeneration extending peripherally greater than the unepithelized area. It was necessary to resect all this tissue before healing could be induced.

By the nature of high frequency currents a similar condition could be produced in the bladder neck. These currents depend on high voltage for their passage through the body, a unit of high resistance.

With the galvanic cautery cutting is accomplished with a hot blade similar to all galvanic cauteries in use for various operations. No electrical current is passed through the body, and the heat two millimeters away from the hot blade is minimal and of no consequence. In a large series of cases treated with galvanic cautery transurethral resection delayed hemorrhages occurred in 1.12 per cent of the cases. A series of 290 unselected cases of prostatic obstruction were treated by galvanic cautery transurethral resection with a total mortality of 2.4 per cent.

Delayed hemorrhage was but a factor in 0.6 per cent of the cases. Immediate serious hemorrhage requiring cystotomy, and with 1 death, occurred twice. Eighteen and one-half Gm. of tissue were removed in the average case. Eighty-eight per cent of the subjects have been free of residual urine in eight weeks, and 90 per cent in three months. Particular attention to thorough grooving of the lateral lobes and the leaving of an adequate blood supply to all prostatic tissue was urged.

Use of Acetyl-Beta-Methylcholine Chloride Iontophoresis in Non-Arterial Peripheral Vascular Disease. Hugh Montgomery.

Am. J. Med. Sci. **201**:2:277 (Feb.) 1941.

Acetyl-beta-methylcholine chloride iontophoresis greatly increases cutaneous blood flow and is a useful adjunct to the therapy of some non-arterial peripheral vascular disorders. The augmented blood flow may be the cause of the improvement. It is recognized that the disorders for which the procedure has been recommended are chronic and usually relapsing under most forms of accepted therapy. There is some beneficial result in some cases of scleroderma, but therapy must be continued over a long period of time. Varicose and post-thrombophlebitic ulcers tend to become smaller, cleaner, and less uncomfortable, but they usually fail to heal and the benefits are usually transient. The procedure is recommended for the treatment of these ulcers only after more direct measures have failed or before surgical treatment is instituted. It is not a substitute for surgical measures designed to correct incompetence of venous valves, but it does help improve ulcers sufficiently to make surgery safer. The best results are obtained in relieving post-thrombophlebitic discomfort. The dangers of acetyl-beta-methylcholine chloride iontophoresis are remote, with the exception of burns which occur when electrode metal touches the skin, or when the importance of the relation of the strength of the current to the size of the electrodes is not appreciated.

A New Conductive Heating Device to Provide Uniform Heating of the Periarticular Structures of the Shoulder Joint. F. H. Krusen.

Proc. Staff Meet., Mayo Clin. **16**:328 (May 21) 1941.

When radiant heat is applied to a shoulder by means of the ordinary heat lamp, the rays converge on only one surface and the lamp is usually applied over the scapular, deltoid or pectoral region, and little heating of the periarticular structures in the axillary space or other surfaces of the shoulder is obtained.

Because periarthritis of the shoulder joint is extremely common, it seemed logical to attempt to construct an inexpensive device which would provide controllable, uniform heating of all surfaces of the shoulder girdle and upper part of the arm. The device which is illustrated does provide such uniform heating, and the early studies indicate that it should be suitable for this purpose.

Treatment of Recent Colles' Fractures. Samuel P. Newman.

Rocky Mountain M. J. **38**:211 (Mar.) 1941.

After reduction, immobilization may be accomplished by using a plaster cast. Plaster immobilization is most satisfactory because the cast may be moulded for the particular case. If a padded cast is applied the plaster may be "pulled on" somewhat snugly.

The site of the fracture should be reexamined by roentgenograms within twenty-four hours after the reduction. If the physician suspects that there has been a loss of position of the reduction, reexamination by roentgenograms should be made.

"Post-reduction care" is as important as the treatment given for reduction. For the first two or three days the patient should elevate the hand at frequent intervals to eliminate swelling. Circulation should be watched and if it has been interfered with the cast should be split. After the

first two or three days the patient should be encouraged to use the fingers and thumb actively in gripping and performing minor duties. These exercises help to overcome stiffness. In elderly patients it has been the custom of the author to remove the plaster cast at the end of sixteen to eighteen days and place the wrist in a neutral position but with continued immobilization for another two weeks. In this change, disturbance in the relation of the fragments should be avoided. Immobilization should be continued until the union is sufficient to prevent the fragments from being displaced by the ordinary acts performed by the person. When immobilization has been discontinued, physical therapy in the form of baking, diathermy, and massage may decrease the period of disability. Forcible passive movement should never be used. If scar tissue is present it should be stretched rather than torn. Active use returns the function of the extremity quicker, and to a more normal degree, than any other procedure. Active motions may be encouraged by having the patient squeeze a soft rubber ball, pick up small objects and so on.

Surgical Treatment of Detachment of the Retina. W. R. Buffington.

New Orleans M. & S. J. **93**:495 (April) 1941.

Buffington obtained good results by the following procedure: 1. A careful history as to cause. 2. The location in the field of vision of the first subjective symptoms of flickerings or field defects. 3. A careful study of the detachment. 4. Localization of tear, tears, or disinsertion. 5. Immobilization, and bandaging both eyes to study the effect on advancement or recession of the detachment, and better to localize the tear. 6. Preparation of the patient as for a cataract extraction or any other intraocular surgery.

Careful fixation of the patient; localization of the tear, if possible; and a study of the extent and type of detachment.

The element of time between detachment and operation, according to Buffington, is not as important as it was once thought to be. Some of his best results have been obtained after six months or more.

After the conjunctiva and one or more muscles are divided, and the markings made for location on the scleral surface, 20 to 30 fine, short, sharp, micropins are introduced through the sclera with a diathermic current of 30 to 40 milliamperes. The more inaccessible areas marked for treatment are then punctured with the Lacarrere instrument using a current of 50 to 60 milliamperes. All pins are then removed quickly, almost simultaneously. The failure of the subretinal fluid to be evacuated often defeats the purpose of the operation. It is vital for the retina to come in contact with the diathermically treated choroid. A point the author stresses is that the subretinal fluid drains most successfully from the multiple micropin punctures when the pins are removed almost simultaneously. This is true if all the pins are kept in place until the operation is completed. The author believes that better drainage is due to the uniform hydrostatic escape of the subretinal fluid causing the detachment.

Short Wave in Surgery. Karl Schlaepfer.

West. J. Surg. **49**:153 (March) 1941.

Inasmuch as heat and hyperemia with consecutive increased cellular metabolism are the main responses of tissue to short wave, inflammation is the main field for its clinical usage. The application of diathermy (300 meters wavelength) is contraindicated in acute inflammation. The proper application of short wave diathermy (30 to 3 meters wavelength) gives good results in acute inflammation and is due to the uniform penetration of the inflamed tissue by the current. More rapid elimination of the products of abnormal cell metabolism in the inflamed area is facilitated by the active hyperemia in the capillaries and arterioles and by the increased lymph flow with the decrease of edema.

Of the inflammations on the surface of the body, the furuncle and carbuncle are discussed. Results vary according to the character of the lesion at the time the short wave application is started. In an early lesion without necrosis, resolution may be expected with one to two treatments. The infiltration and the redness should disappear and the pain should be relieved. If necrosis is already present in the center of the lesion, the use of short wave may accelerate the demarcation. The core should be easily removed without the use of surgery. Abscesses of the sweat gland are characterized by the tendency to multiply. Even roentgenotherapy cannot prevent such a course. Short wave application may direct the process and may lead to a permanent cure. It is important to continue the treatment until all induration and all redness have disappeared.

Cellulitis (panaritium), lymphangitis and lymphadenitis respond readily to the use of short wave. Results may be spectacular if the process has not progressed too far before the application of short wave. If the process is already advanced, suppuration should become rapidly localized, facilitating incision. The cavity of the abscess is lined by exuberant healthy granulations and the healing period thereby is shortened. Short wave application should be continued until almost complete healing is obtained.

Erysipelas and erysipeloids respond well to the use of short wave and preferably combined with the use of ultraviolet. Sinusitis (acute and chronic) is cured without much supportive treatment. The use of short wave is superior to the use of other forms of heat. In angina, and laryngitis, it gives good results. The application of short wave following various traumas with injury to soft tissue (hematomas, bruises) will hasten the absorption of the extravasated blood and will reduce the concomitant edema. In acute and chronic bursitis, the proper application of short wave will assist restitution to normal. In fibrositis and myositis, short wave proves beneficial, because of less im-

pairing scar formation, which otherwise results in permanently restricted function. Epididymitis and prostatitis in their sub-acute and chronic stages respond well to the use of short wave therapy.

Experimental Study of Maximal Fever Therapy. K. Wakabayashi.

Mitt. a. d. med. Akad. zu Kioto **31**:57 (Jan.) 1941.

Wakabayashi endeavored to study the mechanism involved in the effect of fever therapy by using various fever-inducing agents such as bacterial vaccines and certain chemicals. The effect of temperature varying between 37 and 41 C. on the growth of gonococci on cystinsaccharose-blood nutrient mediums was found to be negligible up to five hours, but thereafter such temperatures increased the death rate of the organisms. The addition to the culture mediums of antigonococcus silver preparations greatly decreased the resistance of the organisms against heat. The comparative studies of blood pictures following various types of fever therapy (vaccine injections and administration of sulfur preparations) indicated that sulfur is the most satisfactory agent in that it produced no appreciable changes in the blood picture, and the duration of fever was constant. Gonococcus vaccine, however, proved to be effective in stimulating the functions of hemopoietic organs, the reticuloendothelial system and phagocytosis; thus fever therapy as induced by the injection of gonococcus vaccine differs essentially from the so-called stimulation threshold therapy of Zimmer in that it is more in line with the panenergetic reaction of Mulzer and Keining. According to the latter authors there are three phases of the reaction induced by stimulation, namely (1) the phase of stimulation threshold, (2) the phase of provocation and (3) the panenergetic phase. The first and the last phases are favorable for therapeutic effect, while the second is unfavorable. The author agrees with the opinion of Weichardt that the principle of omnicellular activation is the fundamental mechanism involved in the therapeutic effect of fever therapy. — [Abstr. J. A. M. A. **117**: 153 (July 12) 1941.]

The Problem of Rheumatism and Arthritis. Review of American and English Literature for 1939 (Seventh Rheumatism Review). Phillip S. Hench; Walter Bauer; Henry Dawson; Francis Hall; W. Paul Holbrook; J. Albert Key, and Currier McEwen.

Ann. Int. Med. **14**:1631 (March) 1941.

Fibrositis accounts for from 30 to 60 per cent of all cases of rheumatic diseases according to some physicians. About 75 per cent of the cases encountered at the arthritis clinic, De Paul Hospital, St. Louis, in 1938, were of fibrositis.

Fibrositis was classified by Abel, Siebert and Earp thus: (1) primary fibrositis; an affection of fibrous tissue independent of atrophic arthritis or any other articular disease; in these cases atrophic arthritis practically never develops later; (2) secondary fibrositis; fibrous tissue changes secondary to atrophic arthritis, specific infections, trauma, etc.; (3) senile fibrositis; fibrositic changes which occur with age. Of their 71 cases these writers called 55 primary and 16 secondary (20 acute and 51 chronic).

Conventional treatment was outlined: removal of infected foci, use of physical therapy, especially massage, use of warm clothing; avoidance of chilling, drafts, colds and influenza. No special diet was generally advocated, but Bach prescribed a lactovegetarian diet in cases presumably caused by intestinal putrefaction. Neligan and Cyriax upheld the English view on the great value of heavy massage: in cases of "rheumatic headaches, provided the correct spots are massaged firmly and persistently, there should be next to no failures." According to Crichton-Miller patients whose fibrositis fails to respond to physical therapy may have some psychologic reason for wishing to remain ill or to continue treatment. Others considered heavy massage provocative of exacerbations, and used light massage only, and that only in chronic cases. In acute cases moist heat is preferable to diathermy. Recommended were autohemotherapy and/or fever therapy, bee venom, streptococcic vaccine, Crowe's vaccine and colloidal sulfur. For lumbar fascitis Creed and Romer recommended early manipulation under anesthesia as productive of much quicker results than those from rest, heat, etc.: it may give "instantaneous relief." Injections of procaine were strongly recommended by Steinbrocker for lumbar fascitis, by Cyriax for cervical fibrositis. For diffuse lumbar or gluteal fibrositis Steinbrocker made deep injections of 10 cc. of 2 per cent procaine with 25 to 100 cc. normal saline solution. Painful tender nodules were penetrated with a needle; 5 to 10 drops were deposited therein and 3 to 5 cc. injected around the nodule. For nodules unaffected thereby he injected 3 to 6 mm. of 95 per cent alcohol into the nodule, 5 cc. aqueous procaine solution around the nodule. Of 15 patients with fibrositis so treated 10 obtained "marked or complete relief." Cyriax infiltrated persistently tender cervical spots in muscles with 1 in 200 watery solution of procaine or 1 in 50 solution of procaine in olive oil.

PRELIMINARY PROGRAM

INTENSIVE INSTRUCTION SEMINAR

20TH ANNUAL SESSION

American Congress of Physical Therapy

25TH ANNUAL SESSION

American Occupational Therapy Association

SEPTEMBER 1, 2, 3, 4, 5, 1941

THE MAYFLOWER WASHINGTON, D. C.

SCHEDULE OF INSTRUCTION COURSE

TUESDAY SEPTEMBER 2

8:30 to 9:30—(E 1)	*Local Application of Heat.* Pan-American Room.
8:30 to 9:30—(AF 1)	*Physics of Heat Therapy.* 17th St. Parlor.
8:30 to 9:30—(AC 1)	*Physical Therapy in Relation to Internal Medicine.* North Room.
8:30 to 9:30—(AG 1)	*Occupational Therapy.* Mezzanine A.
9:30 to 10:30—(E 2)	*General Application of Heat (Fever Therapy).* Pan-American Room.
9:30 to 10:30—(AF 2)	*Physics of Light Therapy.* 17th St. Parlor.
9:30 to 10:30—(AC 2)	*Physical Therapy in Surgery.* North Room.
9:30 to 10:30—(AG 2)	*Physical Therapy in Amputations.* Mezzanine A.
11:00 to 12:00—(E 3)	*Light Therapy: Infra-Red Radiation.* Pan-American Room.
11:00 to 12:00—(AF 3)	*Physics of Electrotherapy.* 17th St. Parlor.
11:00 to 12:00—(AC 3)	*Physical Therapy in Orthopedics.* North Room.
11:00 to 12:00—(AG 3)	*Physical Therapy in Cerebral Palsy.* Mezzanine A.

WEDNESDAY, SEPTEMBER 3

8:30 to 9:30—(E 4)	*Light Therapy: Ultraviolet Radiation.* Pan-American Room.
8:30 to 9:30—(AF 4)	*Sources of Heat Radiation.* 17th St. Parlor.
8:30 to 9:30—(AC 4)	*Physical Therapy in Arthritis.* North Room.
8:30 to 9:30—(AG 4)	*Physical Therapy in Poliomyelitis.* Mezzanine A.
9:30 to 10:30—(E 5)	*Electrotherapy: Low Voltage Currents.* Pan-American Room.
9:30 to 10:30—(AF 5)	*Sources of Ultraviolet Radiation.* 17th St. Parlor.
9:30 to 10:30—(AC 5)	*Physical Therapy in Dermatology.* North Room.
9:30 to 10:30—(AG 5)	*Fever Therapy.* Mezzanine A.
11:00 to 12:00—(E 6)	*Electrotherapy: High Frequency Currents.* Pan-American Room.
11:00 to 12:00—(AF 6)	*Sources of Low Voltage and High Frequency Currents.* 17th St. Parlor.
11:00 to 12:00—(AC 6)	*Physical Therapy in Otorhinolaryngology.* North Room.
11:00 to 12:00—(AG 6)	*Cryotherapy.* Mezzanine A.

THURSDAY, SEPTEMBER 4

8:30 to 9:30—(E 7)	*Hydrotherapy.* Pan-American Room.
8:30 to 9:30—(AF 7)	*Physiologic Effects of Heat.* 17th St. Parlor.
8:30 to 9:30—(AC 7)	*Physical Therapy in Pediatrics.* North Room.
8:30 to 9:30—(AG 7)	*Operation of Hospital Department of Physical Therapy.* Mezzanine A.
9:30 to 10:30—(E 8)	*Massage.* Pan-American Room.
9:30 to 10:30—(AF 8)	*Physiologic Effects of Ultraviolet Radiation.* 17th St. Parlor.
9:30 to 10:30—(AC 8)	*Physical Therapy in Neurology.* North Room.
9:30 to 10:30—(AG 8)	*Physical Therapy in Peripheral Nerve Injuries.* Mezzanine A.
11:00 to 12:00—(E 9)	*Corrective Exercise.* Pan-American Room.
11:00 to 12:00—(AF 9)	*Physiologic Effects of Hydrotherapy.* 17th St. Parlor.
11:00 to 12:00—(AC 9)	*Physical Therapy in Urology.* North Room.
11:00 to 12:00—(AG 9)	*Corrective Exercises and Foot Exercises.* Mezzanine A.

FRIDAY, SEPTEMBER 6

8:30 to 9:30—(E 10)	*Occupational Therapy.* Pan-American Room.
8:30 to 9:30—(AF 10)	*Physiology of Massage and Exercise.* 17th St. Parlor.
8:30 to 9:30—(AC 10)	*Physical Therapy in Obstetrics and Gynecology.* North Room.
8:30 to 9:30—(AG 10)	*Low Back Pain.* Mezzanine A.
9:30 to 10:30—(E 11)	*Clinical Aspects of Physical Therapy.* Pan-American Room.
9:30 to 10:30—(AF 11)	*Research Technic in Physical Therapy.* 17th St. Parlor.
9:30 to 10:30—(AC 11)	*Physical Therapy in Proctology.* North Room.
9:30 to 10:30—(AG 11)	*Physical Therapy in Fractures.* Mezzanine A.
11:00 to 12:00—(E 12)	*Administration of Physical Therapy Department.* Pan-American Room.
11:00 to 12:00—(AF 12)	*Correlation of Fundamental and Clinical Aspects of Physical Therapy.* 17th St. Parlor.
11:00 to 12:00—(AC 12)	*Physical Therapy in Industrial Medicine.* North Room.
11:00 to 12:00—(AG 12)	*Physical Therapy in General Practice.* Mezzanine A.

LECTURERS FOR INSTRUCTION COURSE

WILLIAM T. ANDERSON, JR., Ph.D., Newark, N. J.;
HANS J. BEHREND, M.D., Attending Physical Therapeutist, Welfare Hospital; Associate Physical Therapeutist, Hospital for Joint Diseases, New York;
ROBERT L. BENNETT, JR., M.D., Director, School of Physical Therapy, Georgia Warm Springs Foundation, Warm Springs, Ga.;
WILLIAM BIERMAN, M.D., Assistant Clinical Professor, Therapeutics, New York University College of Medicine; Attending Physical Therapeutist, Mount Sinai Hospital, New York;
BEN L. BOYNTON, M.D., Director, Physical Therapy Department, Norfolk General Hospital, Norfolk, Va.;
HOWARD A. CARTER, B.S., in M.E., Secretary, Council on Physical Therapy, American Medical Association, Chicago;
JOHN S. COULTER, M.D., Associate Professor, Physical Therapy, Northwestern University Medical School; Member, Council on Physical Therapy, American Medical Association, Chicago;
JOHN D. CURRENCE, M.D., Assistant Clinical Professor, Medicine, Post-Graduate Medical School and Hospital, Columbia University, New York;
M. J. DORCAS, Ph.D., Cleveland;
EARL C. ELKINS, M.D., Consultant, Section on Physical Therapy, Mayo Clinic, Rochester, Minn.;
FRANK H. EWERHARDT, M.D., Professor, Physical Therapeutics, Washington University School of Medicine, St. Louis;
K. G. HANSSON, M.D., Assistant Professor, Orthopedics, Cornell University Medical College, New York;
KARL HARPUDER, M.D., Assistant Clinical Professor, Medicine, Columbia University, New York;
EMIL J. C. HILDENBRAND, M.D., Director, Physical Therapy, Garfield Memorial Hospital, Washington, D. C.;
A. R. HOLLENDER, M.D., Miami Beach, Florida;
H. WORLEY KENDELL, M.D., Director, Department of Physical Medicine, Miami Valley Hospital, Dayton, Ohio;
J. I. KENDRICK, M.D., Orthopedist, Cleveland Clinic, Cleveland;
MILAND E. KNAPP, M.D., Clinical Assistant Professor, Physical Therapy, University of Minnesota Hospital; Director, Physical Therapy, Minneapolis General Hospital, Minneapolis;
DISRAELI KOBAK, M.D., Assistant Clinical Professor, Medicine (Physical Therapy), Rush Medical College of University of Chicago, Chicago;
RICHARD KOVACS, M.D., Professor and Director, Physical Therapy, New York Polyclinic Medical School and Hospital, New York;
FRANK H. KRUSEN, M.D., Head of Section on Physical Therapy, Mayo Clinic; Associate Professor, Physical Medicine, The Mayo Foundation, University of Minnesota, Rochester, Minn.;
EDWIN L. LIBBERT, M.D., Director, Physical Therapy, Good Samaritan Hospital, Cincinnati, Lawrenceburg, Ind.;
ROSWELL P. LOWRY, M.D., Staff, Huron Road Hospital, Cleveland;
ALBERT A. MARTUCCI, M.D., Director, Physical Therapy, Abington Memorial Hospital, and Protestant Episcopal Hospital of Philadelphia, Abington, Penn.;
WALTER S. McCLELLAN, M.D., Associate Professor, Medicine, Albany Medical College; Medical Director, Saratoga Spa, Saratoga Springs, N. Y.
MADGE C. L. McGUINNESS, M.D., Director, Physical Therapy, Lenox Hill, and Misericordia Hospitals, New York;
CHRISTOPHER J. McLOUGHLIN, M.D., Section on Physical Therapy, Mayo Clinic, Rochester, Minn.;
CHARLES D. MOLANDER, B.S., M.D., Associate, Physical Therapy, Northwestern University Medical School; Director, Physical Therapy, Michael Reese Hospital, Chicago;
FRED B. MOOR, M.D., Professor, Pharmacology and Therapeutics, College of Medical Evangelists, Loma Linda, Los Angeles;
KENNETH PHILLIPS, M.D., Chief, Department of Physical Medicine, James M. Jackson Memorial Hospital; Medical Director, Miami Physical Therapy Centre, Miami, Fla.;
NATHAN H. POLMER, M.D., Professor, Physical Therapy, Graduate School of Medicine, Louisiana State University Medical Center, New Orleans;
WILLIAM H. SCHMIDT, M.D., Assistant Professor, Physical Therapy, Jefferson Medical College, Philadelphia;
MILTON G. SCHMITT, M.D., Clinical Assistant, Department of Physical Therapy, Northwestern University Medical School, Chicago;
MYRON M. SCHWARZSCHILD, Physicist, Beth Israel Hospital, New York;
W. B. SEYMOUR, M.D., Director, Physical Therapy, Lakeside Hospital, Cleveland;
CHARLES I. SINGER, M.D., Staff, Long Beach City Hospital, Long Beach, N. Y.;
WALTER M. SOLOMON, M.D., Clinical Instructor, Department of Medicine, Western Reserve University School of Medicine, Cleveland;
B. A. STRICKLAND, Jr., M.D., Captain, Medical Corps; Director, Department of Physical Therapy, Walter Reed General Hospital, Washington, D. C.;
NORMAN E. TITUS, M.D., Consultant in Physical Therapy, Beekman Hospital, Post-Graduate Hospital, New York; Medical Center, Jersey City, N. J., New York;
ARTHUR L. WATKINS, M.D., Director, Physical Therapy Department, Massachusetts General Hospital, Boston;

IMPORTANT INFORMATION

The instruction course will be given mornings during the convention week, enabling attendance at both the course and scientific session during the same period.

Each registrant is allowed the choice of one lecture during a period, there being three instruction periods every day. Twelve lectures may be selected from the forty-eight listed. The charge for the schedule of twelve lectures is $20.00. It is imperative to indicate by number in the application, first and second choice of lectures, since large groups will not be permitted to register for the same course.

The right is reserved to reject any application if the Course Committee finds it desirable to do so. Registration for specific courses cannot be guaranteed when quotas are filled.

For Information Address Executive Director, American Congress of Physical Therapy, 30 N. Michigan Ave., Chicago, Ill.

APPLICATION FOR INSTRUCTION COURSE

In Conjunction with the
20th Annual Scientific and Clinical Session
of the
AMERICAN CONGRESS OF PHYSICAL THERAPY
September 1, 2, 3, 4, 5, 1941
The Mayflower, Washington, D. C.

Name.....
(Print)
Address.....

Are you a member of the A. M. A.?.....Are you a member of your county medical society?.....

Give name .....
Are you a member of the American Registry of Physical Therapy Technicians?.....If you are not a registered technician, please give the name and address of a physician who will sponsor you.....

After reading schedule of courses offered, make up the schedule you wish to take, listing courses by letter and numeral:

Date.....

.....
Signature in ink

Please do not mail check until you are informed that your application has been accepted. Mail to:

American Congress of Physical Therapy
30 North Michigan Avenue Chicago, Illinois

EXECUTIVE MEETING

SUNDAY, August 31, 6 P. M.

By invitation

GENERAL SCIENTIFIC SESSION

MONDAY, September 1, 2 P. M.

BALLROOM

OFFICERS OF THE SECTION

President — NATHAN H. POLMER, New Orleans.
Secretary — RICHARD KOVÁCS, New York.

The Role of Spas in Medical Preparedness.

WALTER S. McCLELLAN, M.D., Associate Professor, Medicine, Albany Medical College; Medical Director, Saratoga Spa, Saratoga Springs, N. Y.

Discussion: Capt. C. S. Stephenson, Washington, D. C.; Euclid M. Smith, M.D., Hot Springs National Park, Ark.; Charles I. Singer, M.D., Long Beach, N. Y.

Studies of the Cause of Pain in Ischemia.

KARL HARPUDER, M.D., Assistant Clinical Professor of Medicine, Columbia University, College of Physicians and Surgeons; Attending Physical Therapeutist, Montefiore Hospital, New York.

Establishing Prognosis of Peripheral Vascular Disease by Aid of Physical Means.

MADGE C. L. McGUINNESS, M.D., Director, Physical Therapy, Lenox Hill and Misericordia Hospitals, New York;

and

ANNA SAMUELSON, M.D., Attending, Peripheral Vascular Disease Clinic, Lenox Hill Hospital, New York.

Discussion of foregoing papers: J. Ross Veal, M.D., Washington, D.C.; M. K. Newman, M.D., Detroit.

ANNUAL BUSINESS MEETING

MONDAY, September 1, 3:30 P. M.

BALLROOM

OFFICERS OF THE SECTION

President — NATHAN H. POLMER, New Orleans.
Secretary — RICHARD KOVÁCS, New York.

GENERAL SCIENTIFIC SESSION

TUESDAY, September 2, 1:30 P. M.

BALLROOM

OFFICERS OF THE SECTION

Chairman — FRANK H. KRUSEN, Rochester, Minn.
Secretary — MADGE C. L. McGUINNESS, New York.

Threshold of Electrical Stimulation.

HOWARD A. CARTER, B.S., in M.E., Secretary, Council on Physical Therapy, American Medical Association, Chicago;

and

JOHN S. COULTER, M.D., Associate Professor, Physical Therapy, Northwestern University Medical School; Member, Council on Physical Therapy, American Medical Association, Chicago.

Studies on the Peripheral Neuromuscular Mechanism.

O. LEONARD HUDDLESTON, M.D., Assistant Professor, Physiology, University of Colorado School of Medicine; Director, Physical Therapy Department, Colorado General Hospital, Denver.

Myogeloses. The Significance of Pathologic Conditions of the Musculature in Acute Disorders of Posture and Locomotion.

HENRY H. JORDAN, M.D., Associate Orthopedic Surgeon, Lenox Hill Hospital, New York.

INTERMISSION — 2:30 to 3:00 P. M.

INSPECTION OF EXHIBITS

Syphilis in Penal Institutions Treated With Fever Therapy.

W. B. HUNTLEY, M.D., Medical Director, State Prison of Southern Michigan, Jackson, Mich.

Discussion: Kenneth Phillips, M.D., Miami, Fla.; Henry Gwynn, M.D., Washington, D. C.; Robert F. Dow, M.D., Paterson, N. J.

Radiant Disinfection of Air.

WILLIAM FIRTH WELLS, B.S., Associate Professor of Research in Air-Borne Infections, University of Pennsylvania School of Medicine, Philadelphia.

Discussion: Louis R. Koller, Ph.D., Schenectady, N. Y.

Technic for Reduction and Ambulatory Treatment of Sacroiliac Displacement.

JANET TRAVELL, M.D., Instructor, Department of Pharmacology, Cornell University Medical College, New York;

and

WILLARD TRAVELL, M.D., New York.

Discussion: Henry Ullrich, M.D., Baltimore; Francis Glenn, M.D., Miami, Fla.; Troy Bagwell, M.D., Knoxville, Tenn.

Functional Disorders of the Foot and Their Treatment.

DUDLEY J. MORTON, M.D., Associate Professor, Anatomy, Columbia University; Research Associate, American Museum of Natural History, New York.

Discussion: Col. Norman Kirk, Washington, D. C.; James I. Kendrick, M.D., Cleveland; Jerome Weiss, M.D., Brooklyn.

EVENING SESSION

TUESDAY, September 2, 8 P. M.

BALLROOM

OFFICERS OF THE SECTION

Chairman — NATHAN H. POLMER, New Orleans.
Secretary — RICHARD KOVÁCS, New York.

FORMAL OPENING OF THE 20th ANNUAL SESSION

INVOCATION

Rev. J. Frederic Wenchel
Pastor, Christ Lutheran Church, Washington, D. C.

ADDRESS OF WELCOME

Reverend David V. McCauley, S. J.
Dean, Georgetown University School of Medicine

Walter A. Bloedorn, M.D.
Dean, The George Washington University School of Medicine

Major General James C. Magee
Surgeon General, United States Army

Rear Admiral Ross T. McIntire
Surgeon General, United States Navy

Brigadier General Frank T. Hines
Administrator, Veterans Administration

Thomas Parran
Surgeon General, United States Public Health Service

INDUCTION OF PRESIDENT-ELECT

ADDRESS

The Contribution of Physical Medicine to the Art of Healing

A. R. Hollender, M.D., Miami Beach, Fla.

Care of the Lame Back Patient.

FRANK R. OBER, M.D., John B. and Buckminster Brown Clinical Professor, Orthopedic Surgery, Harvard Medical School, Boston.

JOINT MEETING

American Congress of Physical Therapy and American Occupational Therapy Association

WEDNESDAY, September 3, 1:30 P. M.

BALLROOM

OFFICERS OF THE SECTION

A. R. HOLLENDER, M.D., *President*, American Congress of Physical Therapy
MISS ELIZABETH MARTIN, O.T.R., *President*, Maryland Occupational Therapy Association
— Co-Chairmen

The Correlation of Physical Therapy and Occupational Therapy in the Treatment of Cerebral Palsy.

WINTHROP M. PHELPS, M.D., Medical Director, Children's Rehabilitation Institute, Inc., Baltimore.

The Value of Physical Therapy in Management of the Cardiac Patient. (Lantern Slides).

WILLIAM G. LEAMAN, JR., M.D., Assistant Professor of Medicine in Charge, Department of Cardiology, Woman's Medical College of Pennsylvania, Philadelphia.

Obstetrical Paralysis.

ROBERT LEE PATTERSON, JR., M.D., Staff, Hospital for the Ruptured and Crippled, New York.

INTERMISSION — 2:30 to 3:00 P. M.

INSPECTION OF EXHIBITS

Treatment of Postural Deformities of the Lower Extremities.

O. ANDERSON ENGH, M.D., Instructor, Orthopedics, George Washington University School of Medicine; Orthopedic Surgeon, Crippled Children's Program, Washington, D. C.

Discussion: F. H. Ewerhardt, M.D., St. Louis; Ben L. Boynton, M.D., Norfolk, Va.;

Three Musketeers — the Patient, Arthritis and Occupational Therapy.

MISS MARGARET L. BLODGETT, O.T.R., Director, Occupational Therapy Department, Robert B. Brigham Hospital, Boston.

Discussion: Custis Lee Hall, M.D., Washington, D. C.

The Operative Treatment of the Lower Extremity in Infantile Paralysis.

A. R. SHANDS, JR., M.D., Visiting Professor of Orthopedic Surgery, University of Pennsylvania School of Medicine; Medical Director, The Nemours Foundation, Wilmington, Del.

Adequate Home Treatment for the Patient With Poliomyelitis.

ROBERT L. BENNETT, M.D., Director, School of Physical Therapy, Georgia Warm Springs Foundation, Warm Springs, Ga.

Discussion of foregoing papers: Francis J. Carr, M.D., New York; Raymond E. Lenhard, M.D., Baltimore; C. E. Irwin, M.D., Warm Springs, Ga.; M. E. Knapp, M.D., Minneapolis.

GENERAL SCIENTIFIC SESSION

THURSDAY, September 4, 1:30 P. M.

BALLROOM

OFFICERS OF THE SECTION

Chairman — DISRAELI KOBAK, Chicago.
Secretary — KENNETH PHILLIPS, Miami, Fla.

Physical Therapy in Flaccid Paralysis.

PAUL LIEBESNY, M.D., Director, Physical Therapy Department, The Bronx Hospital, New York, N. Y.

Some Roentgenologic Findings Which May Be Responsible for Low Back Pain.

BERNARD H. NICHOLS, M.D., Director, Department of Roentgenology, Cleveland Clinic, Cleveland.

Cervical Brachial Syndrome.

K. G. HANSSON, M.D., Assistant Professor, Orthopedics, Cornell University Medical College, New York.

INTERMISSION — 2:30 to 3:00 P. M.

INSPECTION OF EXHIBITS

Hydrotherapy in Local Injuries and Infections.

FRED B. MOOR, M.D., Professor, Pharmacology and Therapeutics, College of Medical Evangelists; Director, Physical Therapy, White Memorial Hospital, Los Angeles.

Discussion: Ralph S. Emerson, M.D., Hempstead, N. Y.; Isadore Levin, M.D., Washington, D. C.; Charles O. Molander, M.D., Chicago.

Peri-Arthritis of the Shoulder: A Comparison of Results Obtained by Physical Therapy and by Roentgen Rays.

WALTER M. SOLOMON, M.D., Clinical Instructor, Department of Medicine, Western Reserve University School of Medicine, Cleveland;

and

JOSEPH MORTON, M.D., Chief Resident, Department of Roentgenology, City Hospital, Cleveland.

Discussion: Frank M. Hand, M.D., Washington, D. C.; B. S. Troedsson, M.D., New York; Darrell C. Crain, M.D., Washington, D.C.

Evaluation of Operative Procedures in Spastic Paralysis.

LEWIS CLARK WAGNER, M.D., Attending Surgeon, Hospital for the Ruptured and Crippled, New York.

Discussion: Arthur A. Thibodeau, M.D., Boston; Francis J. Carr, M.D., New York; John Meredith, M.D., Richmond, Va.

Evaluation of Short Wave Diathermy.

RICHARD KOVÁCS, M.D., Professor, Physical Therapy and Attending Physical Therapeutist, New York Polyclinic Medical School and Hospital, New York.

Discussion: Disraeli Kobak, M.D., Chicago; William Seymour, M.D., Cleveland; Milton G. Schmitt, M.D., Chicago.

EVENING SESSION

THURSDAY, September 5, 8 P. M.

BALLROOM

OFFICERS OF THE SECTION

Chairman — A. R. HOLLENDER, Miami Beach, Fla.
Secretary — FRED B. MOOR, Los Angeles.

Physical Therapy in Arthritis.

BERNARD I. COMROE, M.D., Instructor in Medicine, Schools of Medicine and Dentistry, University of Pennsylvania, Philadelphia.

Convalescent Care of Fracture Patients.

ROBERT H. KENNEDY, M.D., Associate Clinical Professor of Surgery, Columbia University; Chairman, Committee on Fractures and Other Traumas, American College of Surgeons, New York.

Physical Therapy in Medical Education and Research.

W. T. SANGER, M.A., Ph.D., LL.D., President, Medical College of Virginia, Richmond.

Cultivated Relaxation for the Elimination of Nervous Breakdowns.

EDMUND JACOBSON, M.D., Director, Laboratory for Clinical Physiology, Chicago.

GENERAL SCIENTIFIC SESSION

FRIDAY, September 5, 1:30 P. M.

BALLROOM

OFFICERS OF THE SECTION

Chairman — WILLIAM BIERMAN, New York.
Secretary — WILLIAM H. SCHMIDT, Philadelphia.

Electrical Accidents, Shock, Burns and Glare Injury to Eyes.

HART E. FISHER, M.D., Medical Director and Chief Surgeon, Chicago Rapid Transit Company, Chicago North Shore and Milwaukee Railroad, etc.; Assistant Surgeon, St. Luke's Hospital, Chicago.

Physical Treatment of Indurative Headache.

H. L. WILLIAMS, M.D., Assistant Professor, Otolaryngology, Mayo Foundation; Consultant in Otolaryngology, Mayo Clinic, Rochester, Minn.

Muscle Reeducation in Therapy, Including Electrical Stimulation of Muscle and Nerve.

WILLIAM BENHAM SNOW, M.D., Director, Physical Therapy, Columbia-Presbyterian Medical Center and the New York Orthopedic Dispensary and Hospital, New York;
and
A. DAVID GUREWITSCH, M.D., Assistant in Medicine, College of Physicians and Surgeons, Columbia University Medical School, New York.

INTERMISSION — 2:30 to 3:00 P. M.
INSPECTION OF EXHIBITS

The Use of Ultraviolet Rays in Dermatology.

ANTHONY C. CIPOLLARO, M.D., Associate Dermatologist and Syphilologist, Columbia University; Member, Council on Physical Therapy, American Medical Association, New York.
Discussion: Russell Fields, M.D., Washington, D. C.; Walter Teichman, M.D., Washington, D. C.; A. A. Martucci, M.D., Abington, Penn.

Rationalization of Peripheral Vascular Disease.

GEORGE H. YEAGER, M.D., Assistant Professor, Surgery, University of Maryland Medical School, Baltimore.
Discussion: William Bierman, M.D., New York; Andrew Taylor, M.D., Charlotte, N. C.; Karl Harpuder, M.D., New York.

Aids in Diagnosis and Prognosis of Nerve Injuries.

ARTHUR L. WATKINS, M.D., Assistant in Medicine, Harvard Medical School; Director, Physical Therapy, Massachusetts General Hospital, Boston.
Discussion: E. L. Libbert, M.D., Lawrenceburg, Ind.; G. J. P. Barger, M.D., Washington, D. C.

The Present Status of Fever Therapy.

EARL C. ELKINS, M.D., Consultant in Section on Physical Therapy, The Mayo Clinic, Rochester, Minn.
Discussion: Robert M. Stecher, M.D., Cleveland; Capt. B. A. Strickland, Jr., M.C., Washington, D. C.; H. Worley Kendell, M.D., Dayton, Ohio.

HOSPITAL CLINICS

SATURDAY, September 6, 9 to 12 Noon.

Walter Reed General Hospital — Direction — CAPTAIN B. A. STRICKLAND, JR., M.C.
St. Elizabeths Hospital — Direction — WATSON W. ELDRIDGE, JR., M.D.
Doctors Hospital — Direction — ISADORE LEVIN, M.D.
Georgetown University Hospital — Direction — G. J. P. BARGER, M.D.
Garfield Memorial Hospital — Direction — EMIL J. C. HILDENBRAND, M.D.

PROGRAM

TWENTY-FIFTH ANNUAL MEETING

American Occupational Therapy Association

SUNDAY, August 31

10 A. M. Meeting of the House of Delegates — North Room.
2 P. M. Meeting of the Board of Management — North Room.
7 P. M. Dinner or Buffet Supper for House and Board (Guests of District of Columbia and Maryland Occupational Therapy Association).

OPENING SESSION

Registration — 8 A. M. Daily Beginning Monday

MONDAY, September 1, 9:30 A. M.

SAPPHIRE ROOM

Call to Order by President of Association
Everett S. Elwood

INVOCATION
Lt. Col. Henry R. Westcott, Jr.
Chaplain, Walter Reed General Hospital

OFFICIAL WELCOME
B. M. Thornett
Secretary, Board of Commissioners, District of Columbia

ADDRESS
Everett S. Elwood
President, American Occupational Therapy Association

MEMORIAL SERVICE
Lt. Col. Henry R. Westcott, Jr.

ADDRESS
Mrs. Edith M. Stern

ANNUAL BUSINESS MEETING

Reports of:
Executive Secretary — Mrs. Meta R. Cobb, O.T.R.
Treasurer — Miss Harriett A. Robeson, O.T.R.
House of Delegates — Miss Marjorie Fish, O.T.R.
Reports of Committee Chairmen on:
Publicity and Publications — Wm. R. Dunton, Jr., M.D.
Scientific Research — Miss Lucy G. Morse, O.T.R.
Education — Mrs. Winifred C. Kahmann, O.T.R.
Registration — Miss Kathryn Root, O.T.R.
Convention Exhibits — Miss Marion L. Clark, O.T.R.
Revenue — Holland Hudson.
Occupational Therapy and National Defense — Miss Helen Willard, O.T.R.
Nominations — Miss Beatrice Wade, O.T.R.
Election of Officers.
New Business.

GENERAL SESSION

MONDAY, September 1, 2 P. M.

SAPPHIRE ROOM

Presiding: Hugh J. Davis, M.D., Director, Child Hygiene Service, Bureau of Maternal and Child Welfare, D. C.

CARDIAC CHILDREN

A Cornerstone for the Youthful Cardiac in Community Life.

MISS KATHERINE ORR, O.T.R., Boston, Mass.

Recreation While Resting.

MRS. GLADYS ROGERS BROPHIL, O.T.R., Chicago Heart Association, Chicago, Ill.

Children's Reading: Its Uses and Abuses.
MISS LOUISE LATTIMER, Children's Library, Washington, D. C.

The Crippled Children's Program.
ROBERT C. HOOD, M.D., Children's Bureau, Department of Labor, Washington, D. C.

4 P. M. — Inspection and Study of Scientific Exhibits.

MONDAY, September 1, 8 P. M.
NORTH ROOM

Meeting of the Members of the Committee, Psychiatric Division, Research Committee. Miss Lucy Morse, O.T.R., Chairman; Miss Beatrice Wade, O.T.R., Sub-Chairman.

TUESDAY, September 2, 9:30 A. M.

Round Table Conferences.

1. **Musical Therapy** — Jefferson Room.
   Leader — MISS LOIS HANNAFORD.
   Discussants: Miss Irene Grant, O.T.R., Miss Martha Coombs, Miss Elizabeth Sandy.
   Hostess: Miss Sue P. Hurt, O.T.R.
   Secretary: Miss Gladys Carter, O.T.R.

2. **Color Therapy** — Room 259.
   Leader — ERIC P. MOSSE, M.D.
   Discussants: Miss Florence Magilton, Miss Mary M. Junkin, O.T.R.
   Hostess: Mrs. Mary W. Coombs, O.T.R.
   Secretary: Miss Marguerite Emery.

3. **Student Training** — Sapphire Room.
   Leader — MRS. LAURA WOOD FITZSIMMONS, R.N.
   Discussants: Miss Constance Buck, Miss Lucy Morse, O.T.R., Student Nurse.

4. **Work With the Blind** — Room 260.
   Leader — To be announced.
   Discussants: Mrs. Agnes S. Kelley, Miss Elizabeth L. Campbell, O.T.R., Miss Elizabeth L. Pleasants, O.T.R.
   Hostess: To be announced.
   Secretary: To be announced.

TUESDAY, September 2, 1 P. M.

Sight-Seeing Trips — Visits to Museums, etc.

4:30 P. M. White House Reception.

TUESDAY, September 2, 7:30 P. M.
JEFFERSON ROOM

Presiding: William Rush Dunton, Jr., M.D.

7:30 to 8 P. M. — Summary of Round Table — (To be announced.)

Demonstration of Occupational Therapy Technics.

Tapestry Weaving (Finger Extension).
MRS. EMMY SOMMER, O.T.R.

The Fold-Ups: Art Metal With a Stick.
MR. LOUIS J. HAAS, O.T.R.

Adaptation of Bicycle Saw.
Upside Down Loom.
MISS LUCY MORSE, O.T.R.

New Ways in Recreational Therapy.
DR. G. WILSON SHAFFER.
DR. DOUGLAS NOBLE.

(Additional demonstrations to be announced.)

NEUROPSYCHIATRIC MEETING

WEDNESDAY, September 3, 9 A. M.
SAPPHIRE ROOM

Presiding: Dr. Winfred Overholser, Supt., St. Elizabeth's Hospital.

Occupational Therapy in Army General Hospitals.
LT. COL. WILLIAM PORTER, Medical Corps, Walter Reed General Hospital, Washington, D. C.

Adult Education Program for Mental Patients.
R. A. MORTER, M.D., Medical Superintendent, Kalamazoo State Hospital, Kalamazoo, Mich.

The Training of the Male Occupational Therapy Worker.
WALTER A. THOMPSON, M.D., Rockland State Hospital, Orangeburg, N. Y.

Title to be announced.
GEORGE PRESTON, M.D., Commissioner, Mental Hygiene, Baltimore, Md.

The Psycho-Dramatic Approach.
JACOB L. MORENO, M.D., Beacon Hill, Beacon, N. Y.
Discussants to be announced.

WEDNESDAY, September 3, 1:30 P. M.

JOINT MEETING with American Congress of Physical Therapy **(see page 10).**

JOINT BANQUET with American Congress of Physical Therapy — Ballroom — 7 P. M.

THURSDAY, September 4, 9 A. M.

9 to 10:30 A. M. — Ballroom. Veterans Bureau.
Clinical Aspects of the Methods, Value and Results of Occupational Therapy as Administered in the Facilities of the Veterans Administration.
(Speakers — Personnel of Veterans Bureau.)

9 to 10:30 A. M. — Sapphire Room. Tuberculosis — Rehabilitation.
Presiding: J. Winthrop Peabody, M.D., President, District of Columbia Tuberculosis Association and President-Elect, American College of Chest Physicians.

Address —
GEORGE C. RUHLAND, M.D., Health Officer of the District of Columbia.

Relationship of Occupational Therapy to Rehabilitation.
DANIEL LEO FINUCANE, M.D., Superintendent and Medical Director, Glenn Dale Sanatorium, Glenn Dale, Md.

A Craft Sheltered Workshop.
PAUL PHELPS, M.D., Hartford Tuberculosis and Public Health Society, Hartford, Conn.
Discussion: Miss Lucille Rosenthal, O.T.R., Winfield, Ill.; Miss Viola Jones, O.T.R., Rehabilitation Secretary, Tuberculosis and Public Health Society, Inc., Hartford, Conn.; Miss Elizabeth K. Wise, O.T.R., Director, Industrial Workshops, Rochester, N. Y.

10:30 to 10:40 A. M. — Intermission.

10:40 to 12:00 Noon. — Ballroom. Defense.
Occupational Therapy in the Army.
JOHN S. COULTER, M.D., Associate Professor, Physical Therapy, Northwestern University Medical School, Chicago, Ill.
(Other speakers to be announced.)

1:00 P. M. — Hospital Visits.

9:30 A. M. — House of Delegates — Jefferson Room.

2 P. M. — Board of Management — Jefferson Room.

SCIENTIFIC EXHIBITS

DR. HAROLD A. ABRAMSON, Mount Sinai Hospital, New York.

Electrophoretic pore patterns: Electrophoresis of dyes and silver ion in normal and pathologic states of the living human skin.

AMERICAN MEDICAL ASSOCIATION, COUNCIL ON PHYSICAL THERAPY.

Radio interference: Charts and diagrams dealing with the physics of radiation by short wave diathermy with particular reference to interference with radio communications. Simple apparatus will be available to demonstrate the meaning of frequency, wavelengths, frequency drift and frequency stability.

AMERICAN OCCUPATIONAL THERAPY ASSOCIATION.

The scientific exhibit of the American Occupational Therapy Association is designed to serve the members of the American Congress of Physical Therapy and all other allied and interested groups. It will show the application of occupational therapy in neurology, orthopedics, pediatrics, ophthalmology and tuberculosis. Occupational therapy in the general hospital, U. S. Veterans Facility, and in nurses' training will be demonstrated. The American Occupational Therapy Traveling Exhibit will also be shown.

THE AMERICAN PHYSIOTHERAPY ASSOCIATION.

A model showing hydrotherapy equipment and posters illustrating hydrotherapy technics.

AMERICAN REGISTRY OF PHYSICAL THERAPY TECHNICIANS.

Data to show the progress of the Registry.

AMERICAN SOCIETY FOR THE HARD OF HEARING, Washington, D. C.

An educational exhibit giving information regarding the prevention of deafness, the conservation of hearing, hearing tests, hearing aids, lip reading teachers and employment. Posters and charts emphasizing the four-point program of the Society, viz., prevention, conservation, alleviation and rehabilitation.

DR. PHILIP A. CAUFIELD, Department of Surgery, and DR. OTMAR SOLNITSKY, Department of Anatomy, Georgetown University School of Medicine, Washington, D. C.

Surgical anatomy of hand: Drawings and anatomic dissections.

DR. JOHN D. CURRENCE, DR. REX W. FINEGAN, and DR. ALLEN D. TANNEY, New York Post-Graduate Medical School and Hospital, Columbia University, New York.

Physical therapy in arthritis: A demonstration by charts, etc., of the physical therapeutic modalities used in the management of the various forms of arthritis — osteo-, rheumatoid, gouty and gonorrheal. It will consist of roentgenographic studies accompanied by clinical photographs, descriptions of the diagnostic features and laboratory observations.

DISTRICT OF COLUMBIA HEALTH DEPARTMENT, BUREAU OF MATERNAL AND CHILD WELFARE, HANDICAPPED CHILDREN'S UNIT, Washington, D. C.

Posters: Knock-knees; pictures showing causal factors, forms of correction and methods of treatment. Postural round back, pictures showing various deformities associated with round back and methods of treatment. Equipment designed and constructed for special use: Chair for the use of spastics, walkers, foot plates for jig saw, and apparatus for foot exercise.

DR. O. LEONARD HUDDLESTON, and CLAYTON S. WHITE, M.S., University of Colorado, Denver.

Experimental studies on the chemical transmission of nervous impulses of somatic nerves.

DR. K. G. HANSSON, DR. B. S. TROEDSSON, and ERICH SCHWARZKOPF, Ph.D., New York Hospital, Sponsored by The National Foundation for Infantile Paralysis, New York.

Electromyographic studies in infantile paralysis: Equipment used in the study of muscle action-currents in infantile paralysis. Photographic records and enlargements.

DR. K. G. HANSSON, and FLORENCE LILJANDER, B.S., Hospital for Ruptured and Crippled, New York.

Cervico-brachial syndrome.

DR. HENRY H. JORDAN, Lenox Hill Hospital, New York.

Orthopaedic appliances in infantile paralysis: Charts, photographs and models demonstrating principles of construction and application of orthopaedic appliances with special reference to the rehabilitation of the victims of infantile paralysis.

DR. ISADORE LEVIN, Physical Therapy Department, Doctors Hospital, Washington, D. C.

Physical therapy in the treatment of cardiovascular disease: Pictures and explanation of physical methods of management in cardiac cases, hypertensive cases, and peripheral vascular disease.

DR. MADGE C. L. McGUINNESS, Lenox Hill, and Misericordia Hospitals; and DR. ANNA SAMUELSON, Lexon Hill, and Morrisania Hospitals, New York.

Prognosis in peripheral vascular disease: Physical means as an aid in establishing progress. Cases illustrative of the condition.

DR. GEORGE MILEY, The Hahnemann Medical College and Hospital of Philadelphia, Philadelphia.

Ultraviolet blood irradiation therapy in acute pyogenic infections: Wall charts; diagram of technic, optimum dosage, factors affecting dosage, tables of cases from Hahnemann Hospital, Philadelphia, Shadyside Hospital, Pittsburgh, and various Seattle hospitals. Temperature graphs. Abstracts of case histories. Essential apparatus used in the technic will be shown.

DR. HU C. MYERS, and DR. L. S. KING, Myers Clinic, Philippi, W. Va.

Charts, photographs and drawings showing the routine and special physical measures used at the Myers Clinic for the prevention of postoperative thrombophlebitis.

DR. JOSEPH RESNIK, and DR. MAX RITVO, Boston City Hospital, Boston.

Serial roentgenographic films illustrating the gradual absorption of pathologic calcifications about the joints of shoulder, knee and hip. Duration of illness, symptoms, number of visits and type of treatment stated in each instance.

B. A. STRICKLAND, JR., Captain, Medical Corps, U. S. Army, Walter Reed General Hospital, Army Medical Center, Washington, D. C.

Photographs and charts showing physical therapy activities in the medical department of the United States Army.

DR. J. ROSS VEAL, and DR. HUGH HUDSON HUSSEY, Gallinger Hospital and Georgetown University School of Medicine, Washington, D. C.

Acute thrombophlebitis and the post-thrombotic syndrome: A study of the pathologic changes of the circulation in the extremities in acute stages of thrombophlebitis and in the post-thrombotic phase. Outline of treatment in various stages. Complications and their management.

THE VETERANS' ADMINISTRATION, Washington, D. C.

Physical therapy in veterans' administration hospitals.

THE VOLTA BUREAU, Washington, D. C.

Printed material regarding hearing aids and rehabilitation for the hard of hearing, and information for parents of deaf and hard of hearing children.

WILLIAM FIRTH WELLS, B.S., and DR. MILDRED WEEKS WELLS, University of Pennsylvania School of Medicine, Philadelphia.

Air-borne infection, prevention and control: Exhibit demonstrates the prevention and control of air-borne infection by bactericidal irradiation of air; the prevention of air-borne hospital cross infections by ultraviolet light barriers; the control of epidemic childhood contagion by raising the "threshold density" above the "susceptible density," accomplished through radiant disinfection of air, and the method of measurement of sanitary ventilation by radiant disinfection. The exhibit presents clinico-epidemiologic experience with full scale installations in hospitals, institutions, dormitories and schools and offers a code based on the correlation of the measurements of sanitary ventilation with the measurements of the spread of infection and contagion.

TECHNICAL EXHIBITS

Space No. 9 and 10
AMERICAN HOSPITAL SUPPLY CORPORATION.

In Booths 9 and 10 you may examine the Vasoscillator or Sanders Bed — a simple rational adjunct in treating peripheral vascular disease. The Dickson Paraffin Bath, another American specialty, will be displayed. One of the popular models will be in operation to show you the advantages of the modern, insulated, accurately controlled paraffin bath.

Space No. 30
AMERICAN PLETHORATOR COMPANY, INC.

The PLETHORATOR, which provides for controlled vascular exercises with the maximum of efficiency, is a new and valuable entrant into the field of physical therapy. It is a mechanical device, electrically operated. Complete demonstrations and information will be given at the booth.

Space No. 34
ARCHIVES OF PHYSICAL THERAPY.

The leading physical therapy publication, issued monthly, under the auspices of the American Congress of Physical Therapy. Contains most of the scientific papers and addresses presented at the annual session. Other features consist of its abstract section and news and comments, widely acclaimed for its interesting and valuable material. Subscriptions for the ARCHIVES will be taken in Booth 34.

Space No. 37
ART-CRAFT EASEL COMPANY.

The Art-Craft Bed-Easel is designed to make painting, modeling and hand work practical, comfortable activities for bedridden children. It is a combination work tray and easel equipped with art materials, assembled to provide for occupational and creative needs. It is constructed to eliminate the soiling of bedding.

Space No. 35 and 36
THE BURDICK CORPORATION.

The Burdick Corporation will exhibit in booths 35 and 36 their latest models of short wave diathermy units, ultraviolet and infra-red lamps. A feature of special interest will be the Rhythmic Constrictor for the treatment of certain peripheral vascular diseases. Doctors are invited to register for the *Syllabus*, a periodical of physical therapy abstracts from current medical literature.

Space No. 28
CAMERON SURGICAL SPECIALTY COMPANY.

See the new Cameron-Schindler Flexible Gastroscope, the Color-Flash Clinical Camera, the Projectoray and the Mirrorlite. Latest developments in electrically lighted Diagnostic and Operating instruments for all parts of the body also will be shown. Of special interest will be the new inexpensive office model Radio Knife.

Space No. 42
THE COCA-COLA COMPANY.

Coca-Cola will be served with the compliments of the Coca-Cola Company.

Space No. 39
CONFORMAL FOOTWEAR COMPANY.

A new *plastic-fit* shoe will be demonstrated. Enjoy a free trial fitting in CONFORMALS and observe how exclusive plastic innersoles are actually moulded to fit and support your individual arches by a new process based on hydraulic action — the same principle employed by the hydraulic brakes on your car — which assures individually-balanced support for each different foot.

Space No. 27
THE DIERKER COMPANY — MANUFACTURERS.

Dierker Therapeutic Apparatus for administering treatment and medication to accessible cavities; reprints of scientific papers by eminent clinicians, who are users of the Dierker Apparatus, will be available upon request.
6529 Santa Monica Blvd., Los Angeles, California.

Space No. 17
E & J MANUFACTURING COMPANY.

Members and visitors are cordially invited to see an interesting demonstration of mechanical resuscitation as exemplified by the E & J Automatic Resuscitator. The respiratory rate and volume of respiration of the apparatus are controlled by the lungs of the non-breathing patient. Resuscitation, both by mask and catheter, will be demonstrated.

Space No. 45
J. H. EMERSON COMPANY.

The J. H. Emerson Company will include in its exhibit the Emerson Fever Cabinet. After attaining the desired temperature level in the patient, it is maintained by combining minimum air movement with 100 per cent humidity, enabling the use of lower temperatures. A new temporary cooling technic has been developed.

Space No. 1 and 2
H. G. FISCHER & COMPANY.

The best way to look at an automobile, when you plan to buy a new one, is to look under the hood. There's where the real difference lies. Accordingly, we give this special invitation: Look under the hood of the new FISCHER models of apparatus shown! FISCHER shockproof x-ray apparatus, short wave units, ultraviolet and other generators are built to stand the very hardest day by day usage. Demand to be shown the real under-the-hood facts about FISCHER models — Booths No. 1 and 2.

Space No. 33
GENERAL AUTOMATIC CORPORATION.

General Automatic Corporation will exhibit a complete line of short wave instruments, including their D-90, which is an all-automatic instrument. The company will also exhibit their line of infra-red and ultraviolet therapeutic lamps and two models of spark gap electrosurgical instruments. A stop at the General Automatic booth will prove both educational and pleasant.

Space No. 11 and 12
GENERAL ELECTROMEDICAL CORPORATION.

Space No. 15 and 16
GENERAL ELECTRIC X-RAY CORPORATION.

The General Electric X-ray Corporation will show by photographic portrayal the evolution of electropyrexia. Also featured in this exhibit will be the latest G-E equipment for electrosurgery, ultraviolet radiation, inductothermy and electrocardiography.

Space No. 7
HANOVIA CHEMICAL & MFG. COMPANY.

Hanovia will exhibit a complete line of the new self-lighting type ultraviolet quartz lamps, Sollux Radiant Heat Lamps, as well as Short and Ultra Short Wave equipment. Ask for demonstration of the new air-cooled Aero-Kromayer Lamp. Courteous representatives will be on hand to welcome you.

Space No. 4
THE ILLE ELECTRIC CORPORATION.

The Ille Electric Corporation will demonstrate in Booth No. 4 the latest models Underwater Therapy Tanks with Hydro-Massage for the treatment of infantile paralysis, arthritis, and other disabling conditions, a folding Thermostatically Controlled Bed Tent, and Paraffin Bath.

Space No. 23
PAUL E. JOHNSON, MFRS.

A complete line of physical therapy units will be shown. Johnson Short Wave equipment offers special features at attractive prices which will appeal to every physician. The well known line of luminous infra-red lamps and galvanic units has been improved and modernized and gives you endurance service at a low price level. Be sure to see our many exclusive designs of physical therapy equipment and accessories.

Space No. 44
KLOMAN INSTRUMENT COMPANY.

In Space No. 44, the Kloman Instrument Company will have many new pieces of apparatus, especially a new short wave machine, which is considered one of the most up-to-date short wave apparatus made today. Be sure to see this.

Space No. 26
LANG FOOT & ARCH NORMALIZER COMPANY.

Manufacturers of a small, portable, manually operated, simple little device, which exercises the little used muscles and tendons of the foot and leg. It also acts as a mechanical lever which aids in restoring articular motion to the bones of the foot. It has been used personally and also has been prescribed by many physicians. It has been adopted by twenty-five of the leading college football trainers and by many gymnasia, hospitals, corporations, medical departments.

Space No. 32
LEA & FEBIGER.

At space No. 32 Lea & Febiger will exhibit new works including Portis' "Digestive System," Kraines' "Neuroses and Psychoses," Anderson's "Physical Diagnosis," Lewin's "Foot and Ankle," Rony's "Obesity and Leanness" and Adair's "Obstetrics and Gynecology." Among the new editions are Kovács' "Physical Therapy for Nurses," Comroe on "Arthritis," and Bridges' "Dietetics."

Space No. 31
LEPEL HIGH FREQUENCY LABORATORIES, INC.

The Lepel High Frequency Laboratories cordially invite you to visit their booth where they will have on display their latest tube machines including a new ultrashort wave portable unit, their new development of a portable ultraviolet lamp, their latest low volt equipment incorporating galvanic, sinusoidal and faradic currents. Lepel is one of the authorized distributors of the Dierker therapeutic apparatus which will also be on display. See the new oscillator for vacuum electrodes and desiccation.

Space No. 40 and 41
THE LIEBEL-FLARSHEIM COMPANY.

The well known line of L-F Short and Ultra Short Wave Generators . . . as well as the famous Bovie Electro-Surgical Units will be on display at booths No. 40 and 41. In addition, ultraviolet equipment and other newly developed and interesting physical therapy apparatus and accessories will be shown. It will be a pleasure to demonstrate this modern equipment to you and the time spent at Liebel-Flarsheim booths No. 40 and 41 will prove worthwhile.

Space No. 38
R. J. LINDQUIST & CO.

Display of the Chronowave and other electrotherapeutic apparatus. Mr. R. J. Lindquist, in person, will be in attendance.

Space No. 13 and 14
MERCK & COMPANY, INC.

The display at the Merck booth will feature MECHOLYL (acetyl-beta-methylcholine chloride). Mecholyl administered by the method of iontophoresis is of service in the palliative treatment of chronic rheumatoid arthritis, and in the treatment of chronic ulcers, Raynaud's disease, scleroderma, and vasospastic conditions of the extremities. Information regarding Mecholyl may be obtained at the Merck exhibit.

Space No. 8
NATIONAL CARBON COMPANY, INC.

National Carbon Company, Inc., will exhibit and demonstrate four (4) models of "National" Carbon Arc Therapeutic Lamps designed for use in physicians' offices, hospitals and clinics.

Space No. 18
VITAMINERALS COMPANY.

Advanced therapy, in nutritional deficiency, is the keynote of the VITAMINERAL exhibit. Rational supplements of a diet of vitamins combined with essential minerals, aiding in establishment of normal nutritional balance and maximum assimilation, will be exhibited and discussed. An exposition of THE VITAMINERALS COMPANY, a national organization.

MAKE YOUR HOTEL RESERVATIONS FOR WASHINGTON SESSION OF THE CONGRESS

We urge all those contemplating attending the 20th annual scientific and clinical session of the American Congress of Physical Therapy and the 25th annual meeting of the American Occupational Therapy Association to make their hotel reservations as early as possible. While there are many hotels in Washington, The Mayflower, at which the meetings are being held, has assured us that all reservations made in writing, stating time of arrival, will be honored.